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# Nebraska and South Dakota 2000 Missouri River Recreational Use Survey: Supplement II, Nebraska and South Dakota 2000 Missouri River Recreational Use Survey, Fort Randall tailwater to Big Sioux River

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Nebraska and South Dakota 2000 Missouri River Recreational Use Survey

by

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## Executive Summary

The 2000 Missouri River recreational use survey ran 1 April 2000 through 31 December 2000 and covered the Fort Randall Dam to Big Sioux River reach. Recreational user data was collected from postage paid post cards left on vehicles and through personal interviews. Pressure data was collected during a roving survey from ground counts of vehicles, boat trailers, recreational users. Aerial counts were made to compare angling and recreational boating data with ground count data.

Recreational users spent an estimated 745,303 hours on the Missouri River survey reach during 2000. Fishing accounted for an estimated 458,749 hours, or 62% of all use. Boating accounted for an estimated 255,736 hours, or 34% of all use. Hunting, camping, picnicking, sightseeing, observing wildlife, outdoor photography, and other uses combined accounted for only about 4% of the total use.

Anglers caught an estimated 455,988 fish, and harvested an estimated 159,420 fish from Fort Randall Dam to the Big Sioux River during the survey period. Walleye was the single most harvested species at an estimated 29,676 fish and supported a catch rate (harvest rate and released rate combined) of 0.22 fish/hour. Freshwater drum was the second most harvested species at an estimated 20,638 fish, with a catch rate of 0.10 fish/hour. Catfish (channel, blue, flathead, and bullheads) was the most abundant species group in the creel at an estimated 36,500 fish, with a catch rate of 0.21 fish/hour.

Anglers from 29 states were contacted during the survey, with approximately 88% of them being from either Nebraska or South Dakota. Walleye were sought by approximately 45% of the anglers fishing the survey reach, followed by catfish at 21%. Over 60% of the anglers expressed some degree of satisfaction with their angling experience. The majority of the anglers were in favor of the 15 inch minimum length limit for walleye, sauger, and hybrids.

Over 69% of all recreational users indicated they would access the river eight or more times per year. Nearly 79% indicated that the access facilities met their needs. Approximately 42% of the recreational users were involved in trips that required an overnight stay. Most users stayed at state park

campgrounds (25%), followed by motels, state park cabins, private cabins, and private campgrounds in that order.

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## **Introduction**

The Missouri River between Ft. Randall Dam and the mouth of the Big Sioux River provides many outdoor recreational opportunities. From April through December 1984, anglers spent an estimated 55,620 days fishing the Missouri River from Fort Randall Dam to the Gavins Point Dam tailwater (Stone 1985). In addition, spring turkey, waterfowl, archery deer and rifle deer hunters spent an estimated 4,900 days hunting the aforementioned river reach and Lewis and Clark Lake project lands. During that time period hunting and fishing contributed approximately \$1,300,000.00 to the local economy.

From April through September 1994 and May through September 1995 anglers spent 34,840 and 56,340 days respectively, fishing the Missouri River from Fort Randall Dam downstream to Lewis and Clark Lake (Wickstrom 1995; Wickstrom 1996). During these same time periods, anglers spend 27,880 and 32,900 days fishing the Gavins Point Dam Tailwater. The combined value of these fisheries was estimated to be worth between \$2,700,000.00 and \$4,600,000.00 in direct benefits to the local economy.

Recreational users spent over 7,697,000 hours on the Missouri River from the Nebraska / South Dakota border to the mouth of the Big Sioux River from March through November 1992 (Hesse et al. 1993). This survey was conducted at the main access road leading into each recreation area and includes all recreational activities including camping, sight seeing and picnicking. Anglers made 54,128 fishing trips spending 357,482 hours fishing during this time period.

The objective of this survey was to document the types and amounts of recreational use at public access sites (boat ramps and bankline areas) on the Missouri River between Fort Randall Dam and the mouth of the Big Sioux River. Personnel from the U.S. Park Service, Nebraska Game and Parks Commission and South Dakota Department of Game, Fish and Parks cooperated in planning, conducting, analyzing, and conveying the findings of this investigation.

## **Study Site**

For this survey, the Missouri River between Fort Randall Dam (river kilometer (rkm) 1,419) and the mouth of the Big Sioux River (rkm 1,184) was divided into six zones (Table 1) (Figure 1). Zone 1 - Fort Randall, included the tailwater of Fort Randall Dam downstream to head of first island past the spillway boat ramp (rkm 1,417 ). Zone 2 - the Upper River, extended downstream from Zone 1 to the headwaters of Lewis and Clark Lake defined as the mouth of Bazile Creek (rkm 1,352 ). Zone 3 - the Islands, or the headwaters of Lewis and Clark Lake extended from Bazile Creek downstream to the east extent of the accretion islands (rkm 1,335). Zone 4 - Lewis and Clark, extended downstream from the Islands to Gavins Point Dam (rkm 1,308). Zone 5 - Gavins Point, included the tailwater of Gavin Point Dam downstream to the east extent of the public campgrounds on the Nebraska bank (rkm 1,306). Zone 6 - the Lower River, extended downstream from Gavins Point tailwater to the mouth of the Big Sioux River. The number of access sites per zone ranged from 2 in Fort Randall and Gavins Point zones to 10 in the Lewis and Clark zone (Table 1). A complete list of access areas by zone appears in Appendix I.

Table 1. Recreational use survey zones on the Missouri River from the Fort Randall tailwater downstream to the mouth of the Big Sioux River during 2000.

Zone	Name	Upper Boundary (rkm)	Lower Boundary (rkm)	# of NE access sites	# of SD access sites
1	Fort Randall	1,419	1,417	0	2
2	Upper River	1,417	1,352	7	1
3	Islands	1,352	1,335	0	4
4	Lewis and Clark	1,335	1,308	4	6
5	Gavins Point	1,308	1,306	1	1
6	Lower River	1,306	1,184	4	5



Figure 1. Zones used during recreational use survey of the Missouri River from the Fort Randall tailwater to the mouth of the Big Sioux River during 2000.

## **Survey Methods**

### Schedule

The recreational use survey ran from 1 April 2000 through 31 December 2000. Each survey period began on a Saturday and was 28 days long, except for the last period which was only 23 days long. There were 8 pressure counts conducted per period. Within each time period we scheduled four weekend or holiday counts and four weekday counts or one weekend and one weekday count per week. Nebraska Game and Parks Commission and South Dakota Department of Game, Fish and Parks each hired a survey clerk during the summer months and supported the survey with other personnel during the spring and fall. Clerks were limited to 40 hour work weeks. Because of the amount of hours it took to complete a single count (up to 12 hours), only two counts per week were conducted. With remaining hours the survey clerks conducted angler interviews at randomly selected access sites. Because of limited availability of hours and personnel during fall and winter only a limited number of interviews were conducted.

### Pressure Counts - ground

User counts were obtained by driving each bank simultaneously, at one of two randomly selected start times, using one of four randomly selected routes. Clerks counted the number of vehicles with boat trailers and the number of recreational users at each access site. Because of the length of time it could take to visit all sites, only two count times were used. Counts were randomly scheduled to start either at sunrise or to end at sunset. Four different routes were used during the survey to increase the probability that each access site was visited at different times throughout the day. The four routes by zone were, downstream (1-2-3-4-5-6), upstream (6-5-4-3-2-1), split upstream (4-3-2-1-6-5) and split downstream (5-6-1-2-3-4). Because of the number and distance between sites and because the number of man-hours were limited, it was not possible to develop truly randomized routes where sites could be visited randomly throughout the day. In addition to the counts, the clerks recorded the start and stop time for the count trips and the time each access was visited.

### Pressure Counts - aerial

In order to compare the percent of use that ground counts represented, 15 aerial counts were made of bank anglers, boat anglers, fishing boats and recreational boats (7 weekend and 8 week days). Flights originated from Yankton and were flown in the same direction as the count run. Because flight counts were much quicker than ground counts (flights lasted approximately 2 hours) the flights were scheduled to occur midway through of the ground count.

### Post Card Survey

A postage paid post card, used in combination with the ground count, was placed on the windshields of vehicles parked at access areas or handed to recreational users during the count trips (Figure 2). When each post card was issued, the survey clerk recorded the card number on the count form and if applicable, the licence plate number and state and whether the vehicle had a boat trailer. The numbered card, along with a brief informational handout, was slipped into a clear plastic bag and handed to the user or placed underneath the windshield wiper on the vehicle. This post card requested information about recreational activities, party size, a zip code for the party, information about overnight stays, species and number of fish harvested and released and information about frequency of use of that access site and the users satisfaction with the facility.

Figure 2. Front of postage paid post card distributed to recreational users or placed on windshields during recreational use survey of the Missouri River from the Fort Randall tailwater to the mouth of the Big Sioux River during 2000.

## Nebraska - South Dakota Missouri River and Lewis and Clark Lake Recreational Use Survey

MonthDayCard Number

**Number of People in Your Party**

**Please place a check mark by ALL of the activities that you participated in today?**

☐ Bank Fishing

☐ Boating

☐ Observing Wildlife

☐ Boat Fishing

☐ Camping

☐ Photography

☐ Hunting

☐ Picnicking

☐ Sightseeing

☐ Other, please explain

**If you were fishing today**, which species of fish did you fish for and how many did you harvest and how many did you release

Species	Number Harvested	Number Released

**Hours spent fishing:**

**Please enter your zip code**

**Did this trip require an overnight stay?**  
 Yes ☐ No ☐ If Yes, where did you stay?

☐ State Park Campground

☐ Motel or Hotel

☐ State Park Cabin

☐ Private Cabin

☐ Federal Campground

☐ Private Campground

☐ Friend or Relative

☐ Other

**How many days do you expect to use this access during the year?**

☐ Once
 ☐ 2 - 4 Days
 ☐ 5 - 7 Days
 ☐ 8 or More Days

**Did the facilities at this site meet your needs?**  
 Yes ☐ No ☐ If No, please explain on the comment line below.

Comments:

**Angler Interviews**

A second survey instrument was used during angler interviews to collect more specific information about fishing trips including length of fish harvested and fishing trip satisfaction (Figure 3) (OMB Approval #1024 (NPS00-002) Expiration Date:06/30/01). Each form had room for two interviews and one interview collected information on users age and the other on their opinion of the current 15 inch minimum length limit on walleye/sauger. These interviews provided information on trip statistics such as catch rate, party size, trip length to compare with that reported from the user completed post cards. Access sites for interviews were selected at random amongst all sites and the number of surveys conducted varied by day and access site selected. The number of surveys is simply a function of the number of recreational users completing their recreational trip while the survey clerk is surveying.

Figure 3. Interview form used during the recreational use survey of the Missouri River from the Fort Randall tailwater to the mouth of the Big Sioux River during 2000.

[illegible]

<b>Nebraska - South Dakota Missouri River and Lewis &amp; Clark Lake Recreational Use Survey</b>		<b>Interview ID:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div>
<b>Which activities did you participate in today?</b> <input type="checkbox"/> Fishing <input type="checkbox"/> Camping <input type="checkbox"/> Observing wildlife <input type="checkbox"/> Hunting <input type="checkbox"/> Sightseeing <input type="checkbox"/> Photography <input type="checkbox"/> Boating <input type="checkbox"/> Picknicking <input type="checkbox"/> Other _____	<b>Number of People in Party:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <b>Boat</b> <b>Shore</b> (circle one) <b>Zip Code:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <b>Time Start Fishing:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <b>Distance Traveled:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> (miles) <b>Time Stop Fishing:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div>	<b>Date:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <b>Time:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <b>Access Site Code:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <b>Completed Trip</b> <b>Y</b> <b>N</b>
		<b>Clerk:</b> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div> <div style="display: inline-block; width: 40px; height: 20px; border: 1px solid black; margin: 2px;"></div>

## **Data Analysis**

Data from the post cards, user counts and interviews were entered into seven tables in an Microsoft ACCESS database. The tables, variables and variable descriptions are presented in Appendix II. The tables were exported from the database as ASCII text files. All data summarization and analysis was done with SAS statistical analysis software (Version 6.12 for Windows) (SAS Institute 1989).

Calculations of effort and catch, and associated variances and standard errors followed Pollock et al. (1994). Effort and catch were both calculated by survey period, zone, and day type (week end or week day). Catch rate is the number of fish divided by the number of hours spent fishing. Trips are the total number of hours expended during a period by a user group divided by the mean trip length for that group multiplied by the mean party size for that group. In cases where users indicated that they participated in multiple activities we used a hierarchical approach to assign a party to a single user group. This approach was adopted because the survey design did not ask users to assign hours to individual recreational activities and so that we did not overestimate the total number of hours of recreational use. A party was assigned to a user group using the following approach. If the party reported they were fishing or boat fishing they were assigned to the fishing group, if a party reported that they were hunting (but not fishing) they were assigned to the hunting group, if a party reported they were boating (but not fishing or hunting) they were assigned to the boating group and all remaining parties that indicated that they participated in one of the other recreational activities was assigned to the other group. We felt that boating and other recreational activities were a secondary activity to users that were fishing or hunting and other recreational activities were a secondary activity to users that were boating but not hunting or fishing.

This hierarchy was adopted because we were surveying the river access sites only (parking lots at boat ramps and river banklines, rather than the entire park or campground) and the majority of use at these access sites involved these three activities (fishing, hunting or boating). Thus the number of hours reported for fishing also includes hours expended by parties on other activities (hunting, boating, camping,

picnicking, sightseeing, observing wildlife, outdoor photography and other uses), the number of hours reported for hunting also includes hours expended by parties on other activities (boating, camping, picnicking, sightseeing, observing wildlife, outdoor photography and other uses) and the number of hours reported for boating also includes hours expended by parties on other activities (camping, picnicking, sightseeing, observing wildlife, outdoor photography and other uses).

For the comparisons with previous surveys, fishing pressure values and fish harvest values were converted from the four-week format used in this survey to a monthly format. Conversions were made using the following formulas.

1. April = Period 1 + 0.07 \* Period 2
2. May = 0.93 \* Period 2 + 0.18 \* Period 3
3. June = 0.82 \* Period 3 + 0.25 \* Period 4
4. July = 0.75 \* Period 4 + 0.36 \* Period 5
5. August = 0.64 \* Period 5 + 0.46 \* Period 6
6. September = 0.54 \* Period 6 + 0.54 \* Period 7
7. October = 0.46 \* Period 7 + 0.64 \* Period 8
8. November = 0.36 \* Period 8 + 0.71 \* Period 9
9. December = 0.29 \* Period 2 + Period 10

Counts were obtained for this survey from the total number of cards issued and the information from returned cards. On each count day, cards were issued to all users and vehicles and subsequently a percentage of these cards were returned. It was assumed that the percent of use by group for a period and zone calculated from returned cards was representative of non returned

cards. We estimated which user group a non returned card belonged to by the relative percent of use for returned cards for that period and zone. Party size for a non returned card was estimated by using a mean party size for that period group and zone from returned cards.

## **Survey Results and Discussion**

### **Recreational Use**

A total of 4,458 cards were issued on the 75 count days, 2,861 on weekend days and 1,597 on weekdays from 1 April through 31 December 2000 (Table 2). An additional 1,280 cards were issued on survey days and other days, such as count days, which were not used in the final analysis due to incomplete information (usually the result of vehicle trouble or other unforeseen circumstance). Five counts were missed due to weather or equipment failure. In addition, 630 interviews were conducted on 94 different days (Table 3).

Recreational users spent 745,303 hours on the Missouri River between Fort Randall Dam and the mouth of the Big Sioux River from 1 April through 31 December 2000 (Table 4). The amount of use by zone ranged from 50,378 hours in the Islands to 277,404 hours in Lewis and Clark. The periods from 27 May through 18 August 2000 accounted for 68% of the total use for the year.

Recreational fishing accounted for 458,749 hours or nearly 62% of all use followed by boating with 255,736 hours or 34% of the use (Table 5). Hunting and all other activities (camping, picnicking, sightseeing, observing wildlife, outdoor photography and other uses) accounted for



only about 4% of the use. The peak periods for fishing were 29 April through 18 August 2000 when anglers expended 333,659 hours or almost 73% of the total hours spent fishing for the year. Boating use peaked in midsummer with almost 88% or 224,393 hours of the recreational boating occurring during the three periods between 27 May and 18 August 2000. Hunting amounted to 1.3% of the total recreational use in the spring and fall. Other recreational activity peaked in mid to late summer.

Lewis and Clark and Gavins Point supported 432,257 or just over half (58%) of the total recreational hours (Table 6). Fishing use was common in all zones and ranged from 39,014 hours in the Islands to 147,545 hours at Gavins Point. Hunting use was concentrated in the Upper River and the Islands. Almost 68% of the recreational boating occurred on Lewis and Clark.

Anglers spent 147,545 hours fishing at Gavins Point (Table 7). This was over 32% of the total hours spent fishing. Lewis and Clark and the Lower River use followed with 100,297 and 62,176 hours respectively. The peak period for fishing was 27 May through 23 June 2000 with 105,564 hours or 23% of the total. Almost 73% of the fishing occurred between 29 April and 18 August during 2000. Few anglers fished from mid November to the end of the year due to some extremely cold weather. Hunting was concentrated in the fall (92% of the total hours) between 14 October and 8 December 2000 (Table 8). The Islands (4,979 hours) followed by the Upper River (2,739 hours) were the most utilized zones on the river by hunters.

Recreational boaters spent over 173,000 hours on Lewis and Clark and 56,658 hours on the

Lower River (Table 9). These two zones accounted for almost 90% of the recreational boating reported during 2000. Other recreational use (camping, picnicking, sightseeing, observing wildlife, outdoor photography and other uses) at public access areas along the Missouri River accounted for 20,822 hours during 2000 (Table 10). Other recreational activity was most common at Gavins Point and on the Upper and Lower River. Most (83.6%) of the other recreational activity occurred between 27 May and 18 August 2000.

Slightly more than one half (51.4%) of the fishing activity occurred on the weekends, 235,713 hours compared to the weekdays, 233,036 hours (Table 11). Boaters spent more time on the weekends (60%) than during the week (40%). Hunters spent a few more hours during the week hunting (5,326) than during the weekend (4,671). Other recreational use was fairly evenly divided between weekends and weekdays. Anglers fished at Fort Randall more on weekends than weekdays but just the opposite at Gavins Point (Table 12). The Upper River was used more by anglers on the weekends. The Lower River had almost equal use on weekends and weekdays. Both the Islands and Lewis and Clark were used more by anglers on weekends. Hunters utilized the Islands and the Lower River more on weekdays with few differences found throughout the other zones. Recreational boating use on Lewis and Clark accounted for the high weekend use. Weekday use at Gavins Point was slightly higher than weekend use perhaps reflecting the more urban type situation because of the proximity of Yankton, South Dakota.

The mean trip length for the different groups was; fishing - 5.8 hours, hunting - 5.9 hours, boating - 4.5 hours and other - 4.9 hours. The mean party size for the different groups was;

fishing - 2.6 persons, hunting - 2.4 persons, boating - 4.8 persons and other - 2.8 persons. Total number of trips by period and group are presented in Table 13. Fishing (55.8) and boating (40.1) accounted for almost 96% of the trips on the Missouri River between Fort Randall Dam and the mouth of the Big Sioux River during 2000.

The estimated 224,607 hours of fishing activity on the Missouri River between Fort Randall and Gavins Point during April through September 2000 was the highest documented (Table 14). Fishing pressure during April 2000 was up nearly 300% over April 1994 and accounted for much of the increased pressure. June had the highest estimated fishing pressure during 2000, as compared to July during previous surveys. September had the lowest estimated fishing pressure during 2000, and was also the lowest estimate for September for all surveys. In previous surveys, April has had the lowest monthly fishing pressure estimate.

Most of the increased fishing pressure in 2000 occurred in the Upper River and Islands reaches (Table 15). The combined effort of nearly 86,000 hours for the Upper River and Islands was more than 40% greater than the 1995 estimate. Fishing pressure at Fort Randall during 2000 was highest ever reported while fishing pressure on Lewis and Clark had declined since 1995. The estimated 132,460 hours of fishing pressure at Gavins Point Dam tailwater during 2000 was the highest reported (Table 16). Fishing pressure during April, May and June 2000 was higher than during this same time period in previous years. Fishing pressure peaked in May during 2000, unlike previous years when fishing pressure peaked in July. September had the lowest fishing pressure during 2000, similar to that documented for the entire Fort Randall to Gavins

Point tailwater reach

Table 2. Number of counts and number of cards issued by survey period and day type during recreational use survey on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey period	Day type	Number of Counts	Number of Cards Issued
4/1 - 4/28	Weekend	4	402
	Weekday	4	222
4/29 - 5/26	Weekend	4	461
	Weekday	4	270
5/27 - 6/23	Weekend	4	543
	Weekday	4	269
6/24 - 7/21	Weekend	4	330
	Weekday	4	349
7/22 - 8/18	Weekend	4	538
	Weekday	4	184
8/19 - 9/15	Weekend	3	183
	Weekday	3	66
9/16 - 10/13	Weekend	3	145
	Weekday	3	91
10/14 - 11/10	Weekend	4	206
	Weekday	4	165
11/11 - 12-8	Weekend	4	31
	Weekday	4	30
12/9 - 12/31	Weekend	4	22
	Weekday	3	14
Total	Weekend	38	2,861

Survey period	Day type	Number of Counts	Number of Cards Issued
	Weekday	37	1,597
Total		75	4,458
Additional cards issued			1,280

Table 3. Number of interview days and interviews by survey period during the recreational use survey on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Number of Days	Number of Interviews
4/1 - 4/28	11	71
4/29 - 5/26	16	71
5/27 - 6/23	16	111
6/24 - 7/21	12	91
7/22 - 8/18	14	108
8/19 - 9/15	16	80
9/16 - 10/13	8	94
10/14 - 11/10	1	4
11/11 - 12-8	0	0
12/9 - 12/31	0	0
Total	94	630

Table 4. Total number of hours and the standard error by survey period and zone spent by users on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Period										Zone Total
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	11/11-12-8	12/9-12/31	
Fort Randall	10,343 ± 2,078	6,773 ± 1,826	6,625 ± 2,343	7,746 ± 612	10,604 ± 2,012	5,042 ± 903	4,344 ± 1,191	3,219 ± 1,463	170 ± 121	1,617 ± 687	56,483 ± 4,736
Upper River	8,050 ± 2,551	10,196 ± 2,742	14,076 ± 1,938	18,889 ± 1,582	14,828 ± 1,723	4,619 ± 1,457	5,111 ± 688	3,238 ± 960	984 ± 315	0	79,991 ± 5,184
Islands	2,315 ± 609	6,462 ± 1,798	9,345 ± 2,254	8,271 ± 1,856	8,430 ± 1,082	3,797 ± 932	3,390 ± 745	6,490 ± 1,073	1,631 ± 494	247 ± 247	50,378 ± 4,023
Lewis and Clark	4,575 ± 2,068	11,957 ± 2,086	59,008 ± 17,736	91,334 ± 16,218	77,932 ± 20,472	17,616 ± 8,161	7,980 ± 1,338	6,413 ± 3,091	0	588 ± 377	277,404 ± 32,915
Gavins Point	17,239 ± 4,146	30,693 ± 5,588	31,772 ± 12,713	26,315 ± 3,945	23,434 ± 2,436	5,717 ± 1,643	7,432 ± 2,878	11,690 ± 4,439	562 ± 456	0	154,853 ± 16,199
Lower River	2,334 ± 578	8,874 ± 1,248	43,130 ± 14,675	27,322 ± 4,057	28,440 ± 3,340	1,693 ± 459	9,830 ± 3,661	4,572 ± 1,065	0	0	126,195 ± 16,113
Period	44,856	74,955	163,956	179,878	163,668	38,483	38,087	35,622	3,347	2,452	745,303

Total	$\pm 5,744$	$\pm 7,157$	$\pm 26,568$	$\pm 17,360$	$\pm 21,080$	$\pm 8,563$	$\pm 5,092$	$\pm 5,882$	$\pm 752$	$\pm 822$	$\pm 40,877$
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Table 5. Total number of hours and (percent) by survey period and recreational group expended by users on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Group	Period										Group Total
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	11/11-12-8	12/9-12/31	
Fishing	42,933 (5.86)	67,955 (9.1)	105,564 (14.2)	85,990 (11.5)	74,150 (10.0)	22,383 (3.0)	28,254 (3.8)	28,096 (3.8)	1,130 (0.2)	2,293 ( $<0.1$ )	458,749 (61.6)
Hunting	93 ( $<0.1$ )	0	0	0	0	0	553 ( $<0.1$ )	6,976 (0.9)	2,216 ( $<0.1$ )	159 ( $<0.1$ )	9,997 (1.3)
Boating	559 ( $<0.1$ )	6,301 ( $<0.1$ )	56,317 (7.6)	85,989 (11.5)	82,087 (11.0)	15,222 (2.0)	8,816 (1.2)	445 ( $<0.1$ )	0	0	255,736 (34.3)
Other Uses	1,271 (0.2)	699 ( $<0.1$ )	2,076 (0.3)	7,899 (1.1)	7,431 (1.0)	878 (0.1)	464 ( $<0.1$ )	105 ( $<0.1$ )	0	0	20,822 (2.8)
Total	44,856 (6.0)	74,955 (10.1)	163,956 (22.0)	179,878 (24.1)	163,668 (22.0)	38,483 (5.2)	38,087 (5.1)	35,622 (4.8)	3,347 (0.5)	2,452 (0.3)	745,303

Table 6. Total number of hours and (percent) by zone and recreational group expended by users on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Group	Zone						Group Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River	
Fishing	55,121 (7.4)	54,597 (7.3)	39,014 (5.2)	100,297 (13.5)	147,545 (19.8)	62,176 (8.3)	458,749 (61.6)
Hunting	393 (<0.1)	2,739 (0.4)	4,979 (0.7)	508 (<0.1)	587 (<0.1)	791 (0.1)	9,997 (1.3)
Boating	664 (<0.1)	16,967 (2.3)	5,029 (0.7)	173,239 (23.2)	3,179 (0.4)	56,658 (7.6)	255,736 (34.3)
Other Uses	304 (<0.1)	5,688 (0.8)	1,356 (0.2)	3,361 (0.5)	3,542 (0.5)	6,571 (0.9)	20,822 (2.8)
Total	56,483 (7.6)	79,991 (10.7)	50,378 (6.8)	277,404 (37.2)	154,853 (20.8)	126,195 (16.9)	745,303

Table 7. Total number of hours spent fishing and the standard error by survey period and zone on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Period										Zone Total
	4/1- 4/28	4/29- 5/26	5/27- 6/23	6/24- 7/21	7/22- 8/18	8/19- 9/15	9/16- 10/13	10/14- 11/10	11/11- 12-8	12/9- 12/31	
Fort Randall	10,218 ± 2,078	6,594 ± 1,825	6,625 ± 2,343	7,746 ± 612	9,940 ± 2,007	5,042 ± 903	4,140 ± 1,190	3,030 ± 1,460	170 ± 121	1,617 ± 687	55,121 ± 4,733
Upper River	7,951 ± 2,551	9,712 ± 2,739	10,399 ± 1,826	10,920 ± 1,389	5,494 ± 1,016	4,619 ± 1,457	4,117 ± 669	1,084 ± 435	398 ± 178	0	54,597 ± 4,806
Islands	2,005 ± 601	5,956 ± 1,792	8,506 ± 2,242	7,582 ± 1,849	5,942 ± 1,016	3,034 ± 904	2,845 ± 732	2,897 ± 703	0	247 ± 247	39,014 ± 3,867
Lewis and Clark	4,248 ± 2,062	8,894 ± 1,971	31,478 ± 13,435	20,305 ± 4,563	19,005 ± 6,293	2,730 ± 1,452	6,794 ± 1,325	6,413 ± 3,091	0	429 ± 356	100,297 ± 16,205
Gavins Point	16,775 ± 4,145	29,412 ± 5,582	29,101 ± 12,685	24,008 ± 3,934	23,434 ± 2,436	5,717 ± 1,643	7,432 ± 2,878	11,103 ± 4,432	562 ± 456	0	147,545 ± 16,171
Lower River	1,736 ± 553	7,386 ± 1,233	19,454 ± 9,290	15,428 ± 3,269	10,436 ± 1,966	1,242 ± 441	2,926 ± 1,510	3,568 ± 1,043	0	0	62,176 ± 10,308
Period Total	42,933 ± 5,738	67,955 ± 7,113	105,564 ± 21,014	85,990 ± 7,260	74,150 ± 7,449	22,383 ± 2,959	28,254 ± 3,837	28,096 ± 5,754	1,130 ± 504	2,293 ± 813	458,749 ± 26,283

Table 8. Total number of hours spent hunting and the standard error by survey period and zone on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Period										Zone Total
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	11/11-12-8	12/9-12/31	
Fort Randall	0	0	0	0	0	0	204 ± 58	189 ± 89	0	0	393 ± 106
Upper River	0	0	0	0	0	0	0	2,153 ± 856	586 ± 260	0	2,739 ± 894
Islands	0	0	0	0	0	0	0	3,348 ± 809	1,631 ± 494	0	4,979 ± 948
Lewis and Clark	0	0	0	0	0	0	349 ± 68	0	0	159 ± 125	508 ± 142
Gavins Point	0	0	0	0	0	0	0	587 ± 235	0	0	587 ± 235
Lower River	93 ± 30	0	0	0	0	0	0	698 ± 205	0	0	791 ± 207
Period Total	93 ± 30	0	0	0	0	0	553 ± 90	6,976 ± 1,221	2,216 ± 558	159 ± 125	9,997 ± 1,352

Table 9. Total number of hours spent boating and the standard error by survey period and zone on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Period										Zone Total
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	11/11-12-8	12/9-12/31	
Fort Randall	0	0	0	0	664 ± 134	0	0	0	0	0	664 ± 134
Upper River	0	484 ± 137	3,677 ± 650	4,952 ± 646	6,861 ± 1,302	0	994 ± 162	0 0	0	0	16,967 ± 1,607
Islands	0	506 ± 152	839 ± 235	689 ± 168	2,205 ± 369	0	545 ± 138	245 ± 60	0	0	5,029 ± 515
Lewis and Clark	327 ± 155	3,063 ± 684	27,135 ± 11,577	68,319 ± 15,551	58,671 ± 19,481	14,886 ± 8,031	837 ± 172	0	0	0	173,239 ± 28,642
Gavins Point	232 ± 57	1,281 ± 267	990 ± 463	677 ± 111	0	0	0	0	0	0	3,179 ± 549
Lower River	0	968 ± 168	23,676 ± 11,360	11,352 ± 2,400	13,685 ± 2,575	336 ± 120	6,440 ± 3,326	201 ± 59	0	0	56,658 ± 12,351
Period Total	559 ± 165	6,301 ± 781	56,317 ± 16,241	85,989 ± 15,750	82,087 ± 19,697	15,222 ± 8,032	8,816 ± 3,338	445 ± 84	0	0	255,736 ± 31,242

Table 10. Total number of hours spent on other recreational activities (camping, picnicking, sightseeing, observing wildlife, outdoor photography and other uses) and the standard error by survey period and zone on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Period										Zone Total
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	11/11-12-8	12/9-12/31	
Fort Randall	125 ± 26	179 ± 61	0	0	0	0	0	0	0	0	304 ± 66
Upper River	98 ± 33	0	0	3,017 ± 396	2,573 ± 488	0	0	0	0	0	5,688 ± 629
Islands	310 ± 97	0	0	0	283 ± 51	763 ± 226	0	0	0	0	1,356 ± 251
Lewis and Clark	0	0	395 ± 170	2,710 ± 613	256 ± 83	0	0	0	0	0	3,361 ± 641
Gavins Point	232 ± 57	0	1,681 ± 700	1,630 ± 268	0	0	0	0	0	0	3,542 ± 751
Lower River	505 ± 162	520 ± 96	0	542 ± 114	4,320 ± 813	115 ± 41	464 ± 239	105 ± 32	0	0	6,571 ± 877
Period Total	1,271 ± 202	699 ± 114	2,076 ± 720	7,899 ± 785	7,431 ± 953	878 ± 229	464 ± 239	105 ± 32	0	0	20,822 ± 1,486



Table 11. Total number of hours spent by recreational group and day type by survey period on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Group	Day type	Period										Group Total
		4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	11/11-12-8	12/9-12/31	
Fishing	Weekend	21,522	31,578	51,689	44,137	46,372	10,831	16,153	12,131	424	877	235,713
	Weekday	21,411	36,377	53,875	41,853	27,778	11,552	12,101	15,965	707	1,416	223,036
Hunting	Weekend	60	0	0	0	0	0	296	3,505	693	118	4,671
	Weekday	33	0	0	0	0	0	257	3,471	1,524	41	5,326
Boating	Weekend	261	2,808	25,400	45,580	62,845	11,087	5,943	196	0	0	154,121
	Weekday	298	3,493	30,917	40,408	19,242	4,135	2,873	250	0	0	101,615
Other	Weekend	709	339	1,008	4,046	4,988	440	324	30	0	0	11,884
	Weekday	561	360	1,068	3,853	2,443	438	140	75	0	0	8,937
Period Totals	Weekend	22,552	34,726	78,097	93,763	114,204	22,359	22,716	15,862	1,116	994	406,389
	Weekday	22,303	40,229	85,859	86,114	49,464	16,125	15,372	19,760	2,230	1,457	338,914



Table 12. Total number of hours spent by recreational group and day type by zone on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Group	Day type	Zone						Group Total
		Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River	
Fishing	Weekend	28,611	30,700	21,113	57,372	67,234	30,683	235,713
	Weekday	26,510	23,897	17,901	42,924	80,310	31,493	223,036
Hunting	Weekend	147	1,444	2,229	310	269	272	4,671
	Weekday	246	1,295	2,750	198	318	519	5,326
Boating	Weekend	308	10,166	2,907	110,223	1,377	29,140	154,121
	Weekday	356	6,801	2,122	63,015	1,803	27,518	101,615
Other	Weekend	164	3,391	723	1,830	1,589	4,188	11,884
	Weekday	140	2,297	633	1,531	1,954	2,383	8,937
Zone Totals	Weekend	29,230	45,701	26,972	169,736	70,469	64,282	406,389
	Weekday	27,252	34,290	23,406	107,669	84,384	61,912	338,914

Table 13. Total number of trips (percentage) by recreational group and survey period on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Group	Period										Group Total
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	11/11-12-8	12/9-12/31	
Fishing	7,402 (9.4)	11,716 (14.8)	18,201 (23.0)	14,826 (18.7)	12,784 (16.2)	3,859 (4.9)	4,871 (6.2)	4,844 (6.1)	195 (0.2)	395 (0.5)	79,095 (55.8)
Hunting	16 (0.9)	0	0	0	0	0	94 (5.5)	1,182 (69.7)	376 (22.2)	27 (1.6)	1,695 (1.2)
Boating	124 (0.2)	1,400 (2.4)	12,515 (21.3)	19,109 (32.5)	18,242 (31.0)	3,383 (5.8)	1,959 (3.3)	99 (0.2)	0	0	56,830 (40.1)
Other Uses	259 (6.1)	143 (3.4)	424 (10.0)	1,612 (37.9)	1,517 (35.7)	179 (4.2)	95 (2.2)	21 (0.5)	0	0	4,249 (3.0)
Total (percent)	7,801 (5.5)	13,259 (9.3)	31,140 (21.9)	35,547 (25.1)	32,543 (22.9)	7,421 (5.2)	7,019 (4.9)	6,146 (4.3)	571 (0.4)	422 (0.3)	141,869

Table 14. Estimated hours of fishing pressure by month and year for studies on the Missouri River between Fort Randall and Gavins Point Dams.

Year	April	May	June	July	August	September	Total
1984 <sup>1</sup>	7,628	19,165	19,231	22,311	13,864	20,062	102,261
1994 <sup>2</sup>	6,372	17,509	16,284	32,720	17,599	31,448	121,932
1995 <sup>3</sup>	0	24,101	35,965	59,997	33,855	37,625	191,543
2000	26,603	39,236	58,384	49,452	32,939	17,993	224,607

\* not available

<sup>1</sup> Stone 1985   <sup>2</sup> Wickstrom 1995   <sup>3</sup> Wickstrom 1996

Table 15. Estimated hours of fishing pressure by zone and year, April through September, for studies on the Missouri River between Fort Randall and Gavins Point Dams.

Year	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Total
1984 <sup>1</sup>	41,499	40,888		19,874	79,743	182,004

1994 <sup>2</sup>	35,222	36,332	Included in Upper River	50,378	92,002	213,934
1995* <sup>3</sup>	30,533	60,697		100,313	92,123	283,666
2000	48,401	51,318	34,561	90,329	132,460	357,069

\* represents May through September values

<sup>1</sup> Stone 1985   <sup>2</sup> Wickstrom 1995   <sup>3</sup> Wickstrom 1996

Table 16. Estimated hours of fishing pressure by month and year from studies at Gavins Point Dam tailwater.

Year	April	May	June	July	August	September	Total
1984 <sup>1</sup>	7,628	13,985	9,091	19,013	13,865	16,161	79,743
1994 <sup>2</sup>	11,693	15,938	15,911	21,911	20,475	6,075	92,002
1995 <sup>3</sup>	0	16,887	25,840	27,942	8,441	13,013	92,123
2000	18,834	32,591	29,865	26,442	17,628	7,100	132,460

\* not available

<sup>1</sup> Stone 1985 <sup>2</sup> Wickstrom 1995 <sup>3</sup> Wickstrom 1996

### Recreational Fishing

Recreational anglers on the Missouri River caught an estimated 455,988 fish from Fort Randall Dam to the mouth of the Big Sioux River from 1 April through 31 December 2000 (Table 17). Anglers caught 185,866 or 40.7% of the fish from Gavins Point. Catch in other zones ranged from 28,837 fish from the Islands to 82,038 fish from Lewis and Clark. Anglers harvested an estimated 159,420 fish with almost 40% of the harvested fish coming from Gavins Point (Table 18). Harvest from other zones ranged from 10,847 fish harvested from the Islands zone to 28,339 fish harvested from Lewis and Clark. Anglers released 296,569 or almost 57% of the fish that they caught (Table 19). This includes over 122,412 fish caught and released at Gavins Point alone.

The percent of anglers seeking a particular species or species group from both the post card survey and interviews are presented in Table 20. The most popular species sought by anglers from the post card survey were walleye (44.7%), catfish (20.7%), smallmouth bass (5.6%), freshwater drum (3.9%),

common carp (3.8%) and paddlefish (3.1%). The most popular species sought by anglers that were interviewed were walleye (37.6%), channel catfish (27.8%), sauger (8.6%), freshwater drum (7.5%) common carp (4.4%) and smallmouth bass (3.5%).

Because anglers often used generic terms such as catfish, bass, carp, suckers, skipjack, or trout on their post card and because of the very low numbers of many of the species reported, we created several species groups of similar species. We then estimated total number of fish caught, harvested and released and the standard errors for individual species as well as for selected species groups (Table 21).

Walleye was the most abundant species in the creel while catfish (which consisted mostly of channel catfish but included a few flathead catfish, blue catfish and bullheads) was the most abundant species group. Walleye and catfish accounted for almost 43% of the fish caught from 1 April through 31 December 2000 from the Missouri River between Fort Randall Dam and the mouth of the Big Sioux River. They were followed in abundance in the catch by freshwater drum, bass, white bass and smallmouth bass.

Catch, harvest and release rates for individual species or species groups by time period are presented in Table 22. Catch harvest and release rates for the individual species or species groups by zone are presented in Table 23. Catch rates stayed at or very near 1 fish per hour from 1 April through 18 August 2000, after which catch rates started to decline for the remainder of the year (Table 22). Highest overall catch rates were for walleye (0.22 fish/hour) and catfish (0.21 fish/hour) (Table 20). Gavins Point (1.26 fish/hour) and Fort Randall (1.07 fish/hour) had the highest overall total catch rates amongst zones.

Number of harvested fish and mean, minimum and maximum length by species of fish measured during angler interviews by zone are presented in Table 24. Mean length and number of fish harvested for selected species by time period are presented in Table 25. The number of fish caught and harvested by survey period and zone are presented in Table 26. The total number of fish caught, harvested and released with standard errors by survey period and by zone for each species or species group are presented in Tables 27 through 41. Tables 20 through 41 will be discussed in the following species discussions of individual species or species groups.

## Individual Species or Species Group Discussions

### Shovelnose sturgeon, longnose gar, shortnose gar, goldeye (skipjack), skipjack herring, gizzard shad and burbot

Less than one percent of anglers from the post card survey and no anglers from interviews indicated that they were fishing for members of the shovelnose sturgeon, longnose gar, shortnose gar, goldeye (skipjack), skipjack herring, gizzard shad or burbot group (Table 20). Anglers reported catching an estimated 19,672 of this group of fish from 1 April through 31 December 2000 (Table 21). Over 24% of these fish were harvested (no harvest of sturgeon is allowed in this section of Missouri River). Catch rates for this species group ranged from 0.0 to 0.14 fish/hour (29 April to 26 May 2000) by time period (Table 22) and from 0.0 to 0.10 fish/hour (Gavins Point) by zone (Table 23). Only a few goldeye from Gavins Point and Lower River were measured and these fish had a mean length of 345 and 363.3 mm from the two zones respectively (Table 24). This group of fish was caught in all zones, although 78.4% were caught at Gavins Point (Table 26). Most of the harvest (97%) and catch (96%) was prior to 18 August.

### Paddlefish

Just over 3.0% of anglers from the post card survey and 1% of anglers from interviews indicated that they were fishing for paddlefish (Table 20). This is probably a slight underestimate resulting from not issuing postcards at Gavins Point to anglers during the paddlefish snagging season. All paddlefish anglers are already expected to fill out and return a postcard issued to them with their paddlefish permit. We felt that giving each angler a second survey card would negatively bias the paddlefish



survey which is how Nebraska and South Dakota monitor the paddlefish harvest. Anglers reported catching an estimated 1,990 paddlefish from 1 April through 31 December 2000 (Table 21). Over 36% of the paddlefish caught were harvested. Catch rates for paddlefish ranged from 0.0 to 0.05 fish/hour (14 October to 11 November 2000) by time period (Table 22) and from 0.0 to 0.01 fish/hour (Gavins Point and Lower River) by zone (Table 23). Only 3 paddlefish, all from Gavins Point were measured during interviews and these fish had a mean length of 930 mm (Table 24). Although a few fish were reported released in the Upper River and even a limited amount of harvest reported from Lewis and Clark (this was probably due to anglers fishing both Lewis and Clark and Gavins Point the same day), the majority of the paddlefish were caught at Gavins Point and the Lower River (Table 27). Most of the harvest corresponded with the paddlefish snagging season which ran from 1 October through 30 October 2000. Anglers reported harvesting 687 paddlefish during the snagging season.

#### Carp species group: common, grass or bighead carp

Nearly the same percentage of anglers indicated that they were seeking members of the common, grass or bighead carp group from the post card survey (4.5%) as from the angler interviews (4.7%) (Table 20). Carp were the fourth most sought species group from anglers responding to the post card survey and the fifth most sought species group from interviewed anglers. Anglers reported catching an estimated 14,161 carp, from 1 April through 31 December 2000 (Table 21). About 40% of the carp were harvested. Catch rates for this species group ranged from 0.0 to 0.07 fish/hour (29 April to 26 May 2000) by time period (Table 22) and from 0.0 to 0.06 fish/hour (Gavins Point) by zone (Table 23). Only 2 common carp were measured from the Islands zone with a mean length of 557.5 mm and 63 from Gavins Point with a mean length of 579.4 mm during interviews (Table 24). Common carp

were reported in the interviews in all time periods but the first (1 April through 28 April) (Table 25). The smallest carp were caught in late summer and early fall (22 July through 15 September). Carp were caught in all zones although almost 84% were caught downstream of Gavins Point Dam in the tailwater and Lower River (Table 28). Most of the harvest and catch was between 29 April and 18 August.

Sucker species group: river carpsuckers, blue suckers, smallmouth buffalo, bigmouth buffalo or shorthead redhorse

No anglers from either the post card survey or from interviews indicated that they were fishing for members of the river carpsuckers, blue suckers, smallmouth buffalo, bigmouth buffalo or shorthead redhorse group (Table 20). Anglers reported catching an estimated 3,201 members of the “sucker” family from 1 April through 31 December 2000 (Table 21). Over 40% of the suckers were harvested.

Catch rates for this species group ranged from 0.0 to 0.01 fish/hour by time period (Table 22) and from 0.0 to 0.01 fish/hour by zone (Table 23). Only a few suckers were measured during surveys: one bigmouth buffalo (260 mm) and one shorthead redhorse (260 mm) from Gavins Point and two shorthead redhorse from Fort Randall (mean length 442.5 mm) (Table 24). Suckers were caught in all zones except Lewis and Clark although 57.6% were caught in Gavins Point (Table 29). Almost all of the harvest (97%) and most of the catch (85%) was before 21 July.

Catfish species group : channel catfish, blue catfish, flathead catfish and bullheads

Catfish, including channel catfish, flathead catfish, blue catfish and bullheads were the second most popular species or species group sought by both anglers responding to both the post card survey

(23.7%) and the angler interviews (28.0%) (Table 20). Anglers reported catching an estimated 95,999 catfish, (anglers commonly used the term catfish rather than channel catfish, flathead catfish, blue catfish or bullhead), from 1 April through 31 December 2000 (Table 21). Over 38% of the catfish caught were harvested. Catch rates for this species group ranged from 0.0 to 0.39 fish/hour (22 July to 18 August 2000) by time period (Table 22) and from 0.08 to 0.38 fish/hour (Lower River) by zone (Table 23). Over 400 channel catfish and a couple flathead catfish were measured during surveys (Table 24). The mean length of channel catfish harvested by zone ranged from 299.4 mm in the Lower River to 416.5 mm in the Islands. Only two flathead catfish were measured in the Islands zone with a mean length of 650 mm. The mean length of channel catfish harvested by time period varied little (313 - 379 mm) between time periods (Table 25). Catfish were caught in all zones with nearly 32% caught at Gavins Point and Lower River (Table 30). Catch of catfish peaked during the summer from 27 May through 18 August.

### Northern pike

Just 2.0% of anglers from the post card survey and less than 1% of anglers from interviews indicated that they were fishing for northern pike (Table 20). Anglers reported catching an estimated 4,111 northern pike from 1 April through 31 December 2000 (Table 21). About 34% of the northern pike caught were harvested. Catch rates for northern pike ranged from 0.0 to 0.02 fish/hour (16 September to 13 October and 11 November to 8 December 2000) by time period (Table 22) and from 0.0 to 0.04 fish/hour (Islands) by zone (Table 23). A few northern pike were measured during surveys (Table 24). The mean length of northern pike harvested from the Islands zone was 706.7 mm and from Lewis and Clark 641.7 mm. Northern pike were caught in all zones with 34% of the catch coming

from the Islands followed by Fort Randall (22.7%), and the Upper River (18.7%) (Table 31).

Northern pike were caught throughout the year with the peak catch of 996 fish coming during the 29 April to 26 May period.

#### Rainbow and brown trout

Few anglers (0.2%) responding to the post card survey and interviews indicated that they were specifically fishing for trout (Table 20). This reflects the fact that trout fishing is seasonal and limited to Fort Randall. Anglers reported catching an estimated 32,367 rainbow and brown trout from 1 April through 31 December 2000 (Table 21). Almost 90% of the trout caught were harvested. Catch rates for trout ranged from 0.0 to 0.13 fish/hour (1 April to 28 April 2000) by time period (Table 22) and from 0.0 to 0.10 fish/hour (Fort Randall) by zone (Table 23). No trout were measured during surveys (Table 24). Rainbow and brown trout were only reported from Fort Randall with some incidental catch reported from Lewis and Clark (Table 32). The majority of trout were caught during the 1 April to 28 April time period with just over 16% the catch occurring after this and no catch later than the 27 May.

#### White bass

Nearly the same percentage of anglers indicated that they were seeking white bass from the post card survey (1.4%) as from the angler interviews (1.5%) (Table 20). Anglers reported catching an estimated 32,367 white bass from 1 April through 31 December 2000 (Table 21). Over 30% of the white bass caught were harvested. Catch rates for white bass ranged from 0.0 to 0.13 fish/hour (27 May to 23 June 2000) by time period (Table 22) and from 0.0 to 0.16 fish/hour (Gavins Point) by zone

(Table 23). One hundred and forty white bass were measured during surveys most from Gavins Point (Table 24). The mean length of white bass from Gavins Point was 314 mm and ranged from 277.7 mm in Lewis and Clark to 377.5 mm at Fort Randall. The mean length of white bass harvested peaked during the 27 May through 23 June period at 383 mm (Table 25). White bass were caught in all zones with 72% of the catch coming from Gavins Point (Table 33). White bass were caught up until 11 November with the peak catch coming from 29 April through 23 June.

### Bluegill

Just over 1% of the anglers responding to the post card survey and 0.5% of the anglers interviewed indicated that they were seeking bluegill (Table 20). Anglers reported catching an estimated 10,745 bluegill from 1 April through 31 December 2000 (Table 21). Just over 32% of the bluegill caught were harvested. Catch rates for bluegill ranged from 0.0 to 0.05 fish/hour (22 July to 18 August 2000) by time period (Table 22) and from 0.0 to 0.05 fish/hour (Gavins Point) by zone (Table 23). Twenty seven bluegill were measured during surveys with most caught from Gavins Point (Table 24). The mean length of harvested bluegill ranged from 147.5 mm at Gavins Point to 182.5 mm at Fort Randall. The mean length by creel period of harvested bluegill ranged from 155 mm to 195 mm (Table 25). Bluegill were caught in all zones except the Lower River with 69% of the catch coming from Gavins Point (Table 34). Bluegill were caught up until 11 November with the peak catch coming from 22 July through 18 August.

### Sunfish species group: rock bass, yellow perch and other sunfish

Just 0.1% of the anglers responding to the post card survey and 1% of the anglers that indicated that

they were seeking rock bass, yellow perch and other sunfish (Table 20). Anglers reported catching an estimated 3,636 “sunfish” from 1 April through 31 December 2000 (Table 21). Only 13% of the “sunfish” caught were harvested. Catch rates for this species group ranged from 0.0 to 0.02 fish/hour (22 July to 18 August 2000) by time period (Table 22) and from 0.0 to 0.02 fish/hour (Islands) by zone (Table 23). A few rock bass were measured during surveys from Lewis and Clark and Gavins Point and ranged in length from 150 to 223 mm (Table 24). A few yellow perch were measured during surveys from Fort Randall and the Islands and ranged in length from 170 to 320 mm. “Sunfish” were caught in all zones with almost 42% of the catch coming from Fort Randall (Table 35). “Sunfish” were caught up until 11 November with the peak catch coming from 22 July through 18 August.

#### Smallmouth bass

Smallmouth bass were the third most sought after species (5.6%) of anglers responding to the post card survey and were being sought by 3.5% of anglers interviewed (Table 20). Anglers reported catching an estimated 34,666 smallmouth bass from 1 April through 31 December 2000 (Table 21). Over 24% of the smallmouth bass caught were harvested. Catch rates for smallmouth bass ranged from 0.0 to 0.20 fish/hour (29 April to 26 May 2000) by time period (Table 22) and from 0.0 to 0.15 fish/hour (Upper River) by zone (Table 23). Forty six smallmouth bass were measured during surveys (Table 24). The mean length of smallmouth bass harvested ranged from 272.5 mm at Gavins Point to 363 mm in the Islands zone. The mean length of smallmouth bass harvested was highest in the spring and fall (Table 25). Smallmouth bass were caught in all zones with 48% of the catch coming from Gavins Point and 23.6% of the catch coming from the Upper River (Table 36). Smallmouth bass were

reported caught throughout the year except for the 11 November through 8 December period.

#### Largemouth bass

Largemouth bass were sought by 2.1% of the anglers responding to the post card survey and 0.3% of angler interviewed (Table 20). Anglers reported catching an estimated 6,049 largemouth bass from 1 April through 31 December 2000 (Table 21). Only 12% of the largemouth bass caught were harvested. Catch rates for largemouth bass ranged from 0.0 to 0.04 fish/hour (29 April to 26 May 2000) by time period (Table 22) and from 0.0 to 0.05 fish/hour (Islands) by zone (Table 23). A few largemouth bass were measured during surveys (Table 24). The length of largemouth bass harvested ranged from 270 to 460 mm. The mean length of largemouth bass harvested was highest in the spring (Table 25). Largemouth bass were caught in all zones with almost 62% of the catch coming from the Upper River and Islands zones (Table 37). Largemouth bass were caught up until 11 November with the peak being catch coming from 29 April through 26 May.

#### Black bass species group: smallmouth bass and largemouth bass

Anglers often reported seeking bass and this results in bass being the third most sought species group from the post card survey (9.8%) and the sixth most sought species group from anglers that were interviewed 4.4% (Table 20). When all black bass are combined, anglers reported catching an estimated 43,388 bass from 1 April through 31 December 2000 (Table 21). Almost 22% of the bass caught were harvested.

#### Crappie species group: white and black crappie

Crappie, both white and black, were sought by 2.5% of the anglers responding to the post card survey

and 5.3% of anglers that were interviewed (Table 20). Crappie were the fourth most sought species group by anglers interviewed. Anglers reported catching an estimated 11,610 crappie from 1 April through 31 December 2000 (Table 21). Nearly 60% of the crappie caught were harvested. Catch rates for crappie ranged from 0.0 to 0.06 fish/hour (19 August to 15 September 2000) by time period (Table 22) and from 0.0 to 0.09 fish/hour (Islands) by zone (Table 23). Over 150 crappie were measured during surveys (Table 24). The mean length of white crappie harvested ranged from 185 to 358 mm. The mean length of harvested black crappie ranged from 236.98 mm at Gavins Point to 295.6 mm in the Upper River. The mean length of harvested black crappie was highest in the spring and of white crappie in the fall with black crappie being surveyed in the spring and white crappie in the fall (Table 25). White and black crappie were caught in all zones with over 31% of the catch coming from Gavins Point and over 30% coming from the Islands (Table 38). White and black crappie bass were caught up until 11 November with the peak being catch coming from 24 June through 18 August.

### Sauger

Sauger were sought by only 2% of anglers responding to the post card survey but were the third most popular fish species sought (8.6%) by interviewed anglers (Table 20). Anglers reported catching an estimated 8,555 sauger from 1 April through 31 December 2000 (Table 21). About 31% of the sauger caught were harvested. Catch rates for sauger ranged from 0.0 to 0.04 fish/hour (1 April to 28 April 2000 and 14 October to 10 November) by time period (Table 22) and from 0.0 to 0.03 fish/hour (Lower River) by zone (Table 23). Over 150 sauger were measured during surveys (Table 24). The mean length of sauger harvested by zone ranged from 320 mm in the Lower River to 448.5 mm in Lewis and Clark. The mean length of sauger harvested by time period ranged from 302 to 410 mm



(Table 25). Sauger were caught in all zones with over 79% of the catch coming from Lewis and Clark, Gavins Point and the Lower River (Table 39). There were several peaks in sauger catch, during the spring 1 April through 28 April, summer 27 May through 21 July and fall 14 October through 10 November.

### Walleye

Walleye were the most popular fish species sought by both anglers responding to the post card survey (44.7% and anglers that were interviewed (37.6%) (Table 20). The popularity of percids ( walleye, sauger and saugeye) was almost exactly the same from the post card survey (46.7%) and the angler interviews (46.5%). Anglers reported catching an estimated 99,595 walleye from 1 April through 31 December 2000 (Table 21). About 30% of the walleye caught were harvested. Catch rates for walleye ranged from 0.10 to 0.38 fish/hour (1 April to 28 April 2000) by time period (Table 22) and from 0.08 to 0.44 fish/hour (Fort Randall) by zone (Table 23). Over 200 walleye were measured during surveys (Table 24). The mean length of walleye harvested by zone ranged from 340.7 mm in the Lower River to 448.7 mm in Lewis and Clark. The mean length of walleye harvested by time period ranged from 378 to 435 mm (Table 25). Walleye were caught in all zones with the highest catches coming from the Lewis and Clark (34,102 walleye), Fort Randall (34,068 walleye) and Gavins Point (19,284 walleye) (Table 40). Walleye catch was highest in spring showing more or less a decline in catch throughout the year. Walleye were reported caught in all time periods.

### Freshwater drum

Freshwater drum were the fourth most popular species sought (3.9%) by anglers responding to the post

card survey and the third most popular fish species sought (7.5%) by anglers interviewed (Table 20). Anglers reported catching an estimated 44,507 freshwater drum from 1 April through 31 December 2000 (Table 21). Over 46% of the freshwater drum were harvested. Catch rates for freshwater drum ranged from 0.0 to 0.19 fish/hour (24 June to 21 July 2000) by time period (Table 22) and from 0.0 to 0.21 fish/hour (Gavins Point) by zone (Table 23). Over 280 freshwater drum were measured during surveys (Table 24). The length of freshwater drum harvested ranged from 240 mm to 761 mm. The mean length of freshwater drum harvested by time period was fairly constant and ranged from 395 to 484 mm (Table 25). Freshwater drum were caught in all zones with over 68% of the catch coming from Gavins Point (Table 41). Catch of drum slowly increased throughout the spring with the peak coming from 24 June through 21 July, followed by declining catches the rest of the year.

#### Comparison with Previous Surveys

The estimated total harvest of 63,608 fish during 2000 in the Fort Randall to Gavins Point reach was highest reported (Table 42). Walleye was once again the most harvested fish during 2000. Channel catfish was the second most harvested fish during 2000 which is similar to previous surveys except 1995 when it ranked third below walleye and sauger. The total catch rate of 0.28 fish/hour for all species combined during 2000 was second lowest reported (Table 43). Catch rates for walleye, sauger and white bass during 2000 were the lowest reported.

The estimated total harvest of 53,301 fish during 2000 at Gavins Point was second highest reported for all surveyed years (Table 44). Harvest of channel catfish and smallmouth bass was higher during 2000 than previous years. Harvest of walleye, sauger and northern pike was lower than previous

years. The total catch rate of 0.40 fish/hour for all species combined at Gavins Point during 2000 was second lowest of all surveys (Table 45). Catch rates for smallmouth and largemouth bass during 2000 were the highest reported, while catch rates for walleye, sauger and northern pike were the lowest reported.

Table 17. Total number of fish caught (standard error) by survey period and zone catch by survey period and zone from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Survey Period										Total
	4/1- 4/28	4/29- 5/26	5/27- 6/23	6/24- 7/21	7/22- 8/18	8/19- 9/15	9/16- 10/13	10/14- 11/10	11/11- 12-8	12/9- 12/31	
Fort Randall	17,086 (5,633)	7,362 (3,024)	5,581 (2,228)	5,938 (2,849)	12,133 (6,064)	3,526 (1,120)	3,538 (1,580)	2,837 (1,624)	96 (69)	681 (336)	58,778 (9,860)
Upper River	6,831 (3,657)	10,792 (5,384)	11,415 (3,824)	12,770 (3,117)	3,391 (1,970)	5,777 (2,205)	1,812 (563)	0	20 (20)	0	52,807 (8,704)
Islands	877 (469)	7,495 (4,207)	5,023 (1,720)	5,033 (1,955)	5,334 (3,188)	2,518 (1,787)	1,392 (683)	1,163 (674)	0	0	28,837 (6,243)
Lewis and Clark	1,059 (944)	3,113 (1,215)	50,163 (28,754)	6,292 (2,163)	8,508 (5,624)	670 (420)	7,649 (1,929)	4,479 (3,195)	0	104 (104)	82,038 (29,658)
Gavins Point	18,666 (4,859)	52,112 (18,363)	27,197 (13,007)	35,280 (12,986)	38,682 (15,803)	5,043 (3,910)	831 (831)	7,791 (5,059)	264 (264)	0	185,866 (31,464)
Lower River	1,840 (972)	6,784 (2,735)	10,601 (4,765)	10,216 (2,715)	12,763 (4,155)	1,551 (1,181)	2,252 (1,676)	1,655 (1,001)	0	0	47,663 (7,808)
Total	46,360 (8,412)	87,659 (20,049)	109,980 (32,268)	75,528 (14,225)	80,812 (18,694)	19,085 (5,116)	17,474 (3,241)	17,926 (6,316)	379 (274)	785 (352)	455,988 (46,288)



Table 18. Total number of fish harvested (standard error) by survey period and zone catch by survey period and zone from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Survey Period										Total
	4/1- 4/28	4/29- 5/26	5/27- 6/23	6/24- 7/21	7/22- 8/18	8/19- 9/15	9/16- 10/13	10/14- 11/10	11/11- 12-8	12/9- 12/31	
Fort Randall	8,445 (5,081)	2,332 (1,273)	766 (385)	1,861 (757)	3,286 (1,348)	1,937 (721)	1,459 (590)	1,424 (851)	51 (37)	495 (229)	22,055 (5,623)
Upper River	3,248 (1,726)	2,528 (997)	4,387 (1,466)	6,911 (2,963)	276 (182)	1,997 (1,117)	434 (434)	0	0	0	19,780 (4,056)
Islands	565 (271)	2,906 (1,490)	1,539 (471)	1,910 (638)	1,574 (647)	1,529 (1,062)	536 (344)	287 (214)	0	0	10,847 (2,152)
Lewis and Clark	654 (541)	1,326 (562)	15,484 (8,564)	2,963 (1,818)	5,160 (3,608)	249 (207)	1,843 (428)	591 (495)	0	69 (69)	28,339 (9,527)
Gavins Point	5,647 (1,181)	21,852 (6,540)	7,627 (4,561)	12,322 (4,801)	11,709 (6,036)	897 (449)	432 (432)	2,796 (1,865)	171 (171)	0	63,454 (11,329 )
Lower River	520 (406)	3,198 (1,327)	3,657 (961)	3,000 (1,064)	2,616 (1,168)	82 (82)	1,033 (846)	839 (474)	0	0	14,944 (2,508)
Total	19,079 (5,543)	34,141 (7,049)	33,459 (9,879)	28,968 (6,103)	24,620 (7,286)	6,691 (1,774)	5,737 (1,319)	5,938 (2,172)	222 (175 )	565 (239)	159,420 (16,674 )



Table 19. Total number of fish released (standard error) by survey period and zone catch by survey period and zone from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Survey Period										Total
	4/1- 4/28	4/29- 5/26	5/27- 6/23	6/24- 7/21	7/22- 8/18	8/19- 9/15	9/16- 10/13	10/14- 11/10	11/11- 12-8	12/9- 12/31	
Fort Randall	8,641 (2,549)	5,030 (1,834)	4,816 (1,857)	4,076 (2,189)	8,847 (4,848)	1,590 (665)	2,080 (1,015)	1,413 (784)	44 (38)	185 (132)	36,723 (6,611)
Upper River	3,584 (1,992)	8,264 (4,779)	7,028 (2,861)	5,858 (1,264)	3,116 (1,798)	3,780 (1,160)	1,378 (473)	0	20 (20)	0	33,027 (6,434)
Islands	313 (221)	4,590 (2,813)	3,484 (1,433)	3,123 (1,444)	3,760 (2,568)	989 (727)	855 (385)	876 (538)	0	0	17,991 (4,434)
Lewis and Clark	405 (405)	1,787 (949)	34,679 (20,930)	3,329 (1,316)	3,349 (2,056)	421 (322)	5,805 (1,592)	3,888 (3,034)	0	35 (35)	53,698 (21,376)
Gavins Point	13,018 (3,811)	30,260 (13,365)	19,570 (13,749)	22,957 (8,873)	26,973 (11,287)	4,146 (3,868)	400 (400)	4,995 (3,249)	93 (93)	0	122,412 (24,779)
Lower River	1,320 (957)	3,587 (1,535)	6,945 (3,847)	7,216 (2,872)	10,147 (3,868)	1,469 (1,102)	1,219 (836)	816 (558)	0	0	32,718 (6,596)
Total	27,281 (5,111)	53,518 (14,696)	76,521 (25,605)	46,560 (9,858)	56,192 (13,414)	12,394 (4,312)	11,737 (2,189)	11,988 (4,580)	157 (102)	220 (136)	296,569 (34,917)



Table 20. Continued.

Table 20. Percent of anglers who indicated that they were seeking a particular species from the post card and face to face interview survey from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Species	From post cards	From interviews
Paddlefish	3.1	1.1
Gar	<0.1	
Goldeye	0.3	
Skipjack	0.4	
Skipjack herring	0.2	
Grass carp	0.2	0.3
Common carp	3.8	4.4
Bighead carp	0.5	
Bullhead	0.5	
Catfish	20.7	0.2
Blue catfish	0.1	
Channel catfish	2.3	27.8
Flathead catfish	0.1	
Northern pike	2.0	0.6
Trout	0.1	
Rainbow trout	0.1	
Brown trout	0.1	0.3
White bass	1.4	1.5
Sunfish		0.2
Rock bass	0.1	0.6
Bluegill	1.1	0.5

Table 20. Continued.

Species	From post cards	From interviews
Smallmouth bass	5.6	3.5
Spotted bass	0.1	
Largemouth bass	2.1	0.3
Black bass	2.0	0.6
White crappie		1.8
Crappie	2.3	1.8
Black crappie	0.2	1.7
Yellow perch		0.2
Sauger	2.0	8.6
Saugeye		0.3
Walleye	44.7	37.6
Freshwater drum	3.9	7.5
Number of respondents who specified a species or species group weighted by party size	3,067	750
Total number of respondents weighted by party size	3,237	1,139
Percent of total respondents indicating that they were fishing for any species	5.4	34.2

Table 21. Total number of fish harvested, released and caught and the standard error by species or species groups from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Species or species group	Harvest		Released		Total	
	Catch	SE	Catch	SE	Catch	SE
Shovelnose sturgeon, shortnose gar, longnose gar, goldeye, skipjack herring, "skipjack", shad, and burbot	4,744	2,388	14,928	4,004	19,672	5,636
Paddlefish	723	378	1,267	637	1,990	882
Common carp, grass carp and bighead carp	5,653	1,389	8,508	2,270	14,161	2,792
River carpsucker, blue sucker, bigmouth buffalo, smallmouth buffalo and shorthead redhorse	1,295	555	1,906	873	3,201	1,145
Channel catfish, flathead catfish, blue catfish and bullheads	36,500	4,490	59,499	7,521	95,999	10,020
Northern pike	1,373	524	2,738	652	4,111	835
Rainbow and brown trout	5,972	5,342	687	468	6,658	5,448
White bass	9,749	2,531	22,617	8,134	32,367	8,815
Bluegill	3,471	1,372	7,274	2,923	10,745	3,506
Rock bass, yellow perch and other sunfish	470	229	3,165	1,323	3,636	1,346
Smallmouth bass	8,515	2,493	26,151	6,786	34,666	7,781
Largemouth bass	742	314	5,308	1,477	6,049	1,557
All black bass	9,354	2,503	34,034	7,168	43,388	8,006
Black crappie and white crappie	6,926	1,826	4,684	1,685	11,610	3,161
Sauger	2,650	847	5,905	1,538	8,555	1,793
Walleye	29,676	4,383	69,920	11,490	99,595	14,859

Species or species group	Harvest		Released		Total	
	Catch	SE	Catch	SE	Catch	SE
Freshwater drum	20,638	4,743	23,868	4,756	44,507	7,503
Total	159,420	16,674	296,568	34,917	455,988	46,287

Table 22. Continued.

Table 22. Total catch rate (fish per hour) ( harvest rate-released rate) for fish by survey period by anglers from the Missouri River between Fort Randall Dam and the Big Sioux River from April through October, 2000.

Species	Period									
	4/1- 4/28	4/29- 5/26	5/27- 6/23	6/24- 7/21	7/22- 8/18	8/19- 9/15	9/16- 10/13	10/14- 11/10	11/11- 12/8	12/9- 12/31
Shovelnose sturgeon, shortnose gar, longnose gar, goldeye, skipjack herring, "skipjack", shad, and burbot	0.04 (0.01-0.03)	0.14 (0.03-0.11)	0.04 (0.01-0.03)	0.01 (0.01-0.01)	0.03 (0.00-0.03)	0.03 (0.00-0.03)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.03 (0.03-0.00)
Paddlefish	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.02 (0.01-0.01)	0.04 (0.02-0.03)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Common carp, grass carp and bighead carp	0.02 (0.01-0.01)	0.07 (0.04-0.03)	0.02 (0.01-0.01)	0.03 (0.01-0.02)	0.04 (0.01-0.03)	0.00 (0.00-0.00)	0.01 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
River carpsucker, blue sucker, bigmouth buffalo, smallmouth buffalo and shorthead redhorse	0.01 (0.01-0.00)	0.01 (0.01-0.00)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Channel catfish, flathead catfish, blue catfish and bullheads	0.15 (0.07-0.08)	0.11 (0.05-0.06)	0.16 (0.07-0.09)	0.25 (0.08-0.17)	0.39 (0.12-0.26)	0.29 (0.11-0.18)	0.13 (0.07-0.06)	0.12 (0.06-0.06)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Northern pike	0.01 (0.00-0.01)	0.01 (0.01-0.01)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.01 (0.01-0.00)	0.02 (0.00-0.01)	0.01 (0.00-0.01)	0.02 (0.00-0.02)	0.00 (0.00-0.00)
Rainbow and brown trout	0.13 (0.12-0.01)	0.00 (0.00-0.00)	0.01 (0.01-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
White bass	0.05 (0.02-0.03)	0.11 (0.07-0.04)	0.13 (0.01-0.11)	0.04 (0.01-0.03)	0.05 (0.01-0.03)	0.03 (0.03-0.00)	0.04 (0.02-0.02)	0.03 (0.01-0.02)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Bluegill	0.00 (0.00-0.00)	0.02 (0.01-0.02)	0.01 (0.00-0.01)	0.02 (0.01-0.01)	0.05 (0.01-0.05)	0.01 (0.01-0.00)	0.02 (0.00-0.02)	0.04 (0.03-0.01)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Rock bass, yellow perch and other sunfish	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.02 (0.00-0.02)	0.01 (0.01-0.00)	0.00 (0.00-0.00)	0.01 (0.01-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)

Table 22. Continued.

Species	Period									
	4/1- 4/28	4/29- 5/26	5/27- 6/23	6/24- 7/21	7/22- 8/18	8/19- 9/15	9/16- 10/13	10/14- 11/10	11/11- 12/8	12/9- 12/31
Smallmouth bass	0.05 (0.03-0.02)	0.20 (0.06-0.14)	0.07 (0.01-0.07)	0.02 (0.00-0.02)	0.06 (0.02-0.04)	0.09 (0.01-0.09)	0.05 (0.01-0.04)	0.05 (0.03-0.03)	0.00 (0.00-0.00)	0.02 (0.02-0.00)
Largemouth bass	0.02 (0.00-0.02)	0.04 (0.00-0.04)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
All black bass	0.08 (0.03-0.04)	0.25 (0.06-0.18)	0.09 (0.01-0.08)	0.03 (0.00-0.02)	0.07 (0.02-0.05)	0.16 (0.01-0.15)	0.07 (0.01-0.06)	0.06 (0.03-0.03)	0.00 (0.00-0.00)	0.02 (0.02-0.00)
Black crappie and white crappie	0.05 (0.03-0.02)	0.02 (0.01-0.00)	0.00 (0.00-0.00)	0.04 (0.02-0.01)	0.04 (0.02-0.02)	0.06 (0.04-0.02)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Sauger	0.04 (0.02-0.02)	0.01 (0.00-0.01)	0.02 (0.01-0.01)	0.02 (0.00-0.02)	0.01 (0.00-0.01)	0.01 (0.00-0.00)	0.03 (0.01-0.02)	0.04 (0.00-0.04)	0.00 (0.00-0.00)	0.03 (0.03-0.00)
Walleye	0.38 (0.08-0.29)	0.24 (0.08-0.16)	0.29 (0.08-0.21)	0.10 (0.03-0.08)	0.18 (0.08-0.11)	0.10 (0.06-0.04)	0.18 (0.05-0.13)	0.19 (0.03-0.16)	0.24 (0.15-0.09)	0.24 (0.15-0.09)
Freshwater drum	0.02 (0.01-0.01)	0.12 (0.05-0.06)	0.10 (0.04-0.06)	0.19 (0.12-0.07)	0.08 (0.02-0.07)	0.02 (0.00-0.02)	0.05 (0.02-0.04)	0.01 (0.01-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Total	1.08 (0.44-0.64)	1.29 (0.50-0.79)	1.04 (0.32-0.72)	0.88 (0.34-0.54)	1.09 (0.33-0.76)	0.85 (0.30-0.55)	0.62 (0.20-0.42)	0.64 (0.21-0.43)	0.34 (0.20-0.14)	0.34 (0.25-0.10)

Table 23. Coninued.

Table 23. Total catch rate (fish per hour) (harvest rate-released rate) for fish by zone by anglers from the Missouri River between Fort Randall Dam and the Big Sioux River from April through October, 2000.

Species	Zone						Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River	
Shovelnose sturgeon, shortnose gar, longnose gar, goldeye, skipjack herring, "skipjack", shad, and burbot	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.10 (0.03-0.08)	0.04 (0.01-0.03)	0.04 (0.01-0.03)
Paddlefish	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.01 (0.00-0.00)	0.00 (0.00-0.00)
Common carp, grass carp and bighead carp	0.01 (0.00-0.00)	0.01 (0.00-0.00)	0.02 (0.01-0.01)	0.01 (0.00-0.01)	0.06 (0.02-0.04)	0.05 (0.04-0.01)	0.03 (0.01-0.02)
River carpsucker, blue sucker, bigmouth buffalo, smallmouth buffalo and shorthead redhorse	0.00 (0.00-0.00)	0.01 (0.01-0.01)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.01 (0.00-0.00)	0.01 (0.00-0.01)
Channel catfish, flathead catfish, blue catfish and bullheads	0.24 (0.09-0.15)	0.28 (0.14-0.14)	0.13 (0.08-0.05)	0.08 (0.05-0.03)	0.21 (0.07-0.14)	0.38 (0.09-0.29)	0.21 (0.08-0.13)
Northern pike	0.02 (0.01-0.01)	0.01 (0.00-0.01)	0.04 (0.01-0.02)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.01 (0.00-0.01)
Rainbow and brown trout	0.10 (0.10-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.01 (0.01-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.01 (0.01-0.00)
White bass	0.02 (0.00-0.02)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.06 (0.01-0.05)	0.16 (0.05-0.11)	0.01 (0.01-0.00)	0.07 (0.02-0.05)
Bluegill	0.01 (0.01-0.00)	0.01 (0.00-0.00)	0.03 (0.01-0.02)	0.01 (0.00-0.01)	0.05 (0.02-0.03)	0.00 (0.00-0.00)	0.02 (0.01-0.02)
Rock bass, yellow perch and other sunfish	0.03 (0.01-0.02)	0.00 (0.00-0.00)	0.02 (0.00-0.02)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.01 (0.00-0.01)
Smallmouth bass	0.08 (0.03-0.05)	0.15 (0.01-0.14)	0.03 (0.00-0.03)	0.02 (0.01-0.02)	0.11 (0.03-0.08)	0.03 (0.01-0.03)	0.08 (0.02-0.06)

Table 23. Coninued.

Species	Zone						Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River	
Largemouth bass	0.00 (0.00-0.00)	0.03 (0.00-0.03)	0.05 (0.00-0.05)	0.00 (0.00-0.00)	0.01 (0.00-0.01)	0.00 (0.00-0.00)	0.01 (0.00-0.01)
All black bass	0.09 (0.03-0.06)	0.20 (0.01-0.19)	0.10 (0.00-0.10)	0.03 (0.01-0.02)	0.13 (0.04-0.09)	0.04 (0.01-0.03)	0.09 (0.02-0.07)
Black crappie and white crappie	0.00 (0.00-0.00)	0.03 (0.02-0.01)	0.09 (0.05-0.04)	0.02 (0.02-0.00)	0.02 (0.01-0.01)	0.01 (0.01-0.00)	0.03 (0.02-0.01)
Sauger	0.01 (0.00-0.01)	0.02 (0.01-0.01)	0.01 (0.00-0.00)	0.02 (0.01-0.02)	0.02 (0.01-0.01)	0.03 (0.01-0.02)	0.02 (0.01-0.01)
Walleye	0.44 (0.12-0.31)	0.20 (0.07-0.13)	0.15 (0.06-0.09)	0.34 (0.10-0.24)	0.13 (0.03-0.10)	0.08 (0.03-0.05)	0.22 (0.06-0.15)
Freshwater drum	0.00 (0.00-0.00)	0.06 (0.04-0.02)	0.02 (0.00-0.02)	0.08 (0.03-0.05)	0.21 (0.10-0.10)	0.03 (0.01-0.02)	0.10 (0.04-0.05)
Total	1.07 (0.40-0.67)	0.97 (0.36-0.60)	0.74 (0.28-0.46)	0.82 (0.28-0.54)	1.26 (0.43-0.83)	0.77 (0.24-0.53)	0.99 (0.35-0.65)



Table 24. Continued.

Table 24. Number of harvested fish measured, minimum, maximum and mean length by species and zone from the Missouri River between Fort Randall Dam and the Big Sioux River from April through October, 2000.

Species	Zone	N	Minimum	Maximum	Mean
Paddlefish	Gavins Point	3	650	1100	930.0
Goldeye	Gavins Point	10	290	390	345.0
	Lower River	9	340	390	363.3
Grass carp	Gavins Point	1	680		680.0
Common carp	Islands	2	490	625	557.5
	Gavins Point	63	269	744	579.4
Bigmouth buffalo	Gavins Point	1	260		260.0
Shorthead redhorse	Fort Randall	2	440	445	442.5
	Gavins Point	1	260		260.0
Channel catfish	Fort Randall	65	240	740	397.8
	Upper River	28	193	586	328.3
	Islands	17	280	730	416.5
	Lewis and Clark	11	295	606	421.5
	Gavins Point	249	213	550	333.1
	Lower River	31	190	470	299.4
Flathead catfish	Islands	2	640	660	650.0
Northern pike	Islands	6	610	890	706.7
	Lewis and Clark	3	595	675	641.7
Rainbow trout	Fort Randall	1	390		390.0
Brown trout	Fort Randall	1	295		295.0
White bass	Fort Randall	2	345	410	377.5
	Islands	1	280		280.0
	Lewis and Clark	2	275	280	277.5
	Gavins Point	133	150	463	314.1
	Lower River	2	290	290	290.0
Rock bass	Lewis and Clark	1	175		175.0
	Gavins Point	5	150	223	194.8
Bluegill	Fort Randall	2	175	190	182.5

Table 24. Continued.

Species	Zone	N	Minimum	Maximum	Mean
	Islands	6	150	195	169.2
	Lewis and Clark	15	145	195	172.0
	Gavins Point	4	135	165	147.5
Smallmouth bass	Fort Randall	2	320	340	330.0
	Upper River	10	242	465	326.2
	Islands	5	320	420	363.0
	Lewis and Clark	4	250	390	303.8
	Gavins Point	20	200	337	272.5
	Lower River	5	305	360	324.0
Largemouth bass	Islands	12	310	460	387.1
	Gavins Point	4	270	330	306.3
White crappie	Upper River	36	228	358	305.4
	Gavins Point	31	185	340	239.1
Black crappie	Fort Randall	31	205	315	249.7
	Upper River	27	264	324	295.6
	Islands	10	230	315	284.0
	Lewis and Clark	7	220	300	250.0
	Gavins Point	14	202	308	236.9
Yellow perch	Fort Randall	1	250		250.0
	Islands	15	170	320	259.7
Sauger	Fort Randall	2	420	430	425.0
	Upper River	44	261	520	387.0
	Islands	1	435		435.0
	Lewis and Clark	4	379	520	448.5
	Gavins Point	106	211	560	322.5
	Lower River	2	305	335	320.0
Walleye	Fort Randall	54	300	540	399.2
	Upper River	86	267	710	407.0
	Islands	4	380	510	446.3
	Lewis and Clark	15	380	545	448.7
	Gavins Point	48	234	528	326.0

Table 24. Continued.

Species	Zone	N	Minimum	Maximum	Mean
	Lower River	7	290	480	340.7
Freshwater drum	Upper River	1	480		480.0
	Islands	4	375	555	435.0
	Gavins Point	270	245	761	443.9
	Lower River	10	240	460	343.0

Table 25. Mean length (number) of fish harvested by time period by anglers from the Missouri River between the Fort Randall tailwater and the Big Sioux River from April through October, 2000.

Speices	Period						
	4/1- 4/28	4/29- 5/26	5/27- 6/23	6/24- 7/21	7/22- 8/18	8/19- 9/15	9/16- 10/13
Common carp		558 (2)	539 (21)	591 (7)	492 (6)	305 (4)	675 (25)
Channel catfish	379 (25)	347 (50)	313 (61)	328 (47)	354 (121)	370 (59)	341 (38)
White bass	304 (10)	338 (26)	383 (24)	284 (4)	344 (27)	255 (23)	256 (26)
Bluegill	195 (1)		172 (14)	177 (3)	156 (6)	155 (2)	165 (1)
Smallmouth bass	353 (2)	315 (6)	274 (8)	265 (5)	310 (14)	313 (6)	338 (5)
Largemouth bass	407 (3)	455 (1)	313 (2)		354 (4)		359 (6)
White crappie			269 (8)		241 (17)	290 (42)	
Black crappie	297 (18)	254 (10)	260 (55)	239 (5)	240 (1)		
Sauger	337 (78)	410 (19)	302 (21)	349 (3)	349 (17)	359 (10)	358 (11)
Walleye	384 (24)	400 (21)	378 (45)	371 (24)	435 (24)	384 (27)	395 (3)
Freshwater drum	395 (3)	430 (51)	446 (146)	412 (40)	484 (28)	422 (13)	439 (4)

Table 26. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for shovelnose sturgeon, longnose gar, shortnose gar, goldeye (skipjack), skipjack herring, gizzard shad and burbot from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	14 (0)	41 (0)	0	0	1,539 (396)	83 (0)	396 [221]	1,281 [714]	1,677 [879]
4/29 - 5/26	0	0	0	0	8,881 (2,026)	659 (67)	2,094 [2,028]	7,446 [3,482]	9,540 [5,156]
5/27 - 6/23	0	38 (0)	142 (0)	1,078 (0)	2,364 (1,105)	475 (232)	1,337 [1,128]	2,759 [1,492]	4,096 [1,708]
6/24 - 7/21	0	41 (0)	0	0	459 (82)	543 (404)	485 [412]	557 [252]	1,043 [485]
7/22 - 8/18	0	0	0	111 (56)	2,172 (309)	181 (0)	364 [314]	2,100 [846]	2,464 [921]
8/19 - 9/15	0	0	0	0	9 (0)	615 (0)	0	624 [615]	624 [615]
9/16 - 10/13	0	0	0	121 (0)	0	0	0	121 [121]	121 [121]
10/14 - 11/10	12 (0)	0	0	0	0	27 (0)	0	39 [29]	39 [29]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	68 (68)	0	0	0	0	0	68 [68]	0	68 [68]
Harvested	68 [68]	0	0	56 [56]	3,917 [2,341]	703 [468]	4,744 [2,388]		
Released	26 [17]	120 [69]	142 [142]	1,255 [1,086]	11,507 [3,742]	1,879 [907]		14,928 [4,004]	
Total	94	120	142	1,310	15,424	2,582			19,672

	[70]	[69]	[142]	[1,090]	[5,424]	[1,060]			[5,636]
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Table 27. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for paddlefish from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	0	0	0	0	16 (0)	86 (0)	0	102 [88]	102 [88]
4/29 - 5/26	0	21 (0)	0	0	101 (0)	0	0	122 [95]	122 [95]
5/27 - 6/23	0	0	0	0	0	0	0	0	0
6/24 - 7/21	0	0	0	0	17 (17)	0	17 [17]	0	17 [17]
7/22 - 8/18	0	0	0	0	0	0	0	0	0
8/19 - 9/15	0	0	0	0	0	0	0	0	0
9/16 - 10/13	0	0	0	0	488 (255)	28 (14)	269 [256]	246 [233]	515 [488]
10/14 - 11/10	0	0	0	36 (36)	773 (119)	424 (282)	437 [278]	796 [579]	1,233 [723]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	0	0	0	36 [36]	391 [270]	296 [262]	723 [378]		
Released	0	21 [21]	0	0	1,003 [625]	243 [122]		1,267 [637]	
Total	0	21	0	36	1,394	538			1,990

		[21]		[36]	[821]	[320]			[882]
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Table 28. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for all carp (common carp, grass carp and bighead carp) from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	192 (169)	0	9 (9)	71 (71)	264 (21)	374 (308)	578 [359]	331 [215]	909 [401]
4/29 - 5/26	20 (0)	22 (1)	358 (358)	0	3,444 (1,371)	1,177 (1,084)	2,814 [1,119]	2,206 [1,316]	5,020 [1,729]
5/27 - 6/23	28 (0)	87 (0)	98 (0)	588 (0)	542 (60)	941 (836)	896 [410]	1,388 [635]	2,284 [754]
6/24 - 7/21	0	202 (101)	0	0	2,065 (197)	286 (136)	434 [190]	2,119 [1,488]	2,553 [1,513]
7/22 - 8/18	86 (0)	0	267 (0)	0	2,730 (848)	0	848 [582]	2,235 [858]	3,083 [1,325]
8/19 - 9/15	59 (0)	31 (0)	0	0	14 (0)	0	0	104 [68]	104 [68]
9/16 - 10/13	0	11 (0)	0	152 (38)	0	44 (44)	82 [58]	125 [115]	207 [159]
10/14 - 11/10	0	0	0	0	0	0	0	0	0
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	169 [169]	102 [72]	367 [358]	109 [81]	2,498 [937]	2,409 [939]	5,653 [1,389]		
Released	216 [112]	251 [120]	365 [259]	702 [599]	6,561 [2,161]	413 [176]		8,508 [2,270]	
Total	385 [197]	353 [172]	732 [442]	811 [611]	9,058 [2,478]	2,821 [1,008]			14,161 [2,792]



Table 29. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for river carpsuckers, blue suckers, smallmouth buffalo, bigmouth buffalo and shorthead redhorse from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	10 (0)	0	0	0	229 (162)	123 (123)	285 [204]	77 [43]	362 [233]
4/29 - 5/26	0	678 (339)	0	0	246 (246)	0	585 [412]	339 [339]	925 [717]
5/27 - 6/23	0	0	0	0	301 (301)	115 (0)	301 [301]	115 [115]	416 [323]
6/24 - 7/21	18 (18)	0	0	0	1067 (0)	61 (61)	79 [64]	1,067 [757]	1,146 [760]
7/22 - 8/18	0	0	237 (0)	0	0	0	0	237 [237]	237 [237]
8/19 - 9/15	0	15 (0)	0	0	0	0	0	15 [15]	15 [15]
9/16 - 10/13	14 (0)	0	0	0	0	44 (44)	44 [44]	14 [14]	58 [46]
10/14 - 11/10	42 (0)	0	0	0	0	0	0	42 [42]	42 [42]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	18 [18]	339 [339]	0	0	710 [414]	229 [144]	1,295 [555]		
Released	80 [48]	339 [339]	237 [237]	0	1,134 [758]	115 [115]		1,906 [873]	
Total	98 [51]	678 [678]	237 [237]	0	1,844 [870]	344 [185]			3,201 [1,145]

Table 30. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for channel catfish, blue catfish, flathead catfish and bullheads from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	1,481 (389)	1,341 (917)	104 (104)	32 (32)	3,362 (1,457)	122 (21)	2,920 [917]	3,522 [1,442]	6,442 [2,160]
4/29 - 5/26	1,216 (664)	1,856 (878)	669 (64)	239 (0)	3,154 (1,635)	605 (280)	3,521 [1,125]	4,219 [1,258]	7,740 [1,904]
5/27 - 6/23	1,349 (156)	2,768 (1,334)	209 (130)	5,237 (3,598)	1,776 (1,024)	6,064 (1,391)	7,633 [2,390]	9,770 [3,027]	17,403 [4,265]
6/24 - 7/21	1,980 (702)	5,233 (2,553)	1,077 (838)	53 (53)	7,975 (1543)	5,594 (1,419)	7,108 [1,687]	14,805 [4,125]	21,913 [4,857]
7/22 - 8/18	3,033 (752)	631 (0)	2,142 (1,200)	1,624 (870)	11,740 (4362)	9,644 (2,057)	9,240 [2,657]	19,575 [4,723]	28,815 [6,307]
8/19 - 9/15	1,519 (654)	3,364 (1,616)	208 (202)	0	1,070 (0)	312 (0)	2,473 [1,132]	4,000 [1,556]	6,473 [2,442]
9/16 - 10/13	1,710 (879)	341 (341)	628 (392)	645 (379)	0	478 (0)	1,991 [746]	1,810 [707]	3,802 [1,290]
10/14 - 11/10	1,051 (784)	0	0	8 (8)	1,628 (451)	725 (370)	1,614 [771]	1,798 [1,229]	3,413 [1,715]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	4,980 [1,261]	7,639 [1,858]	2,931 [838]	4,940 [2,311]	10,473 [2,656]	5,538 [1,422]	36,500 [4,490]		
Released	8,361 [1,803]	7,895 [1,907]	2,105 [987]	2,899 [1,103]	20,233 [4,385]	18,006 [5,317]		59,499 [7,521]	
Total	13,340 [2,622]	15,534 [3,615]	5,036 [1,670]	7,839 [2,675]	30,706 [6,415]	23,544 [5,419]			95,999 [10,020]

Table 31. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for northern pike from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	54 (54)	336 (16)	82 (0)	0	163 (90)	4 (0)	160 [88]	478 [298]	639 [317]
4/29 - 5/26	63 (0)	62 (0)	664 (470)	12 (12)	109 (29)	85 (0)	511 [471]	485 [218]	996 [518]
5/27 - 6/23	0	23 (23)	311 (0)	171 (171)	0	0	194 [110]	311 [235]	505 [259]
6/24 - 7/21	79 (79)	109 (0)	22 (18)	209 (27)	0	0	123 [85]	296 [199]	420 [217]
7/22 - 8/18	395 (73)	39 (12)	28 (0)	0	168 (17)	0	102 [76]	528 [304]	629 [316]
8/19 - 9/15	85 (85)	0	0	0	0	82 (82)	167 [109]	0	167 [109]
9/16 - 10/13	229 (0)	178 (0)	8 (8)	0	0	10 (10)	18 [13]	407 [267]	425 [267]
10/14 - 11/10	28 (0)	0	273 (87)	9 (9)	0	0	96 [88]	214 [175]	310 [173]
11/11 - 12-8	0	20 (0)	0	0	0	0	0	20 [20]	20 [20]
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	291 [137]	51 [31]	583 [478]	219 [112]	137 [81]	92 [83]	1,373 [524]		
Released	642 [359]	716 [339]	805 [355]	183 [183]	303 [134]	89 [66]		2,738 [652]	
Total	933 [384]	767 [343]	1,388 [589]	401 [214]	440 [168]	182 [106]			4,111 [835]

Table 32. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for rainbow and brown trout from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	5,575 (5,343)	0	0	0	0	0	5,343 [5,312]	232 [141]	5,575 [5,355]
4/29 - 5/26	53 (45)	0	0	0	0	0	45 [45]	8 [8]	53 [45]
5/27 - 6/23	26 (26)	0	0	1,004 (558)	0	0	584 [559]	446 [446]	1,030 [1,005]
6/24 - 7/21	0	0	0	0	0	0	0	0	0
7/22 - 8/18	0	0	0	0	0	0	0	0	0
8/19 - 9/15	0	0	0	0	0	0	0	0	0
9/16 - 10/13	0	0	0	0	0	0	0	0	0
10/14 - 11/10	0	0	0	0	0	0	0	0	0
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	5,414 [5,313]	0	0	558 [558]	0	0	5,972 [5,342]		
Released	240 [141]	0	0	446 [446]	0	0		687 [468]	
Total	5,654 [5,355]	0	0	1,004 [1,004]	0	0			6,658 [5,448]

Table 33. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for white bass from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	55 (55)	109 (58)	0	0	1,866 (554)	65 (0)	666 [286]	1,429 [894]	2,095 [925]
4/29 - 5/26	284 (0)	0	0	326 (66)	6,622 (4,664)	0	4,730 [2,278]	2,503 [1,076]	7,233 [3,005]
5/27 - 6/23	80 (0)	465 (0)	0	4,936 (815)	7,755 (513)	243 (243)	1,572 [728]	11,907 [7,615]	13,479 [7,739]
6/24 - 7/21	0	37 (0)	0	205 (205)	3,142 (242)	47 (20)	467 [272]	2,964 [2,053]	3,431 [2,023]
7/22 - 8/18	432 (0)	0	30 (30)	6 (0)	2,875 (793)	0	823 [530]	2,520 [1,339]	3,343 [1,815]
8/19 - 9/15	9 (9)	33 (8)	0	0	694 (622)	0	640 [312]	96 [75]	736 [357]
9/16 - 10/13	212 (161)	105 (0)	0	476 (105)	0	396 (338)	604 [348]	586 [198]	1,189 [380]
10/14 - 11/10	41 (5)	0	0	427 (105)	388 (139)	5 (0)	249 [174]	612 [409]	861 [515]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	230 [138]	66 [58]	30 [30]	1,296 [667]	7,527 [2,405]	601 [392]	9,749 [2,531]		
Released	882 [468]	684 [477]	0	5,080 [3,069]	15,815 [7,503]	156 [75]		22,617 [8,134]	
Total	1,112 [483]	750 [488]	30 [30]	6,376 [3,698]	23,342 [7,962]	757 [392]			32,367 [8,815]

Table 34. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for bluegill from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	0	0	0	0	0	0	0	0	0
4/29 - 5/26	0	0	385 (192)	0	1,229 (348)	0	541 [324]	1,074 [683]	1,615 [790]
5/27 - 6/23	0	0	329 (66)	160 0	657 (358)	0	424 [364]	721 [429]	1,145 [752]
6/24 - 7/21	0	60 (0)	0	262 (53)	1,776 (771)	0	825 [773]	1,274 [743]	2,099 [1,391]
7/22 - 8/18	604 (345)	229 (57)	395 (0)	0	2,636 (41)	0	443 [351]	3,421 [2,643]	3,865 [2,720]
8/19 - 9/15	189 (189)	0	0	0	0	0	189 [189]	0	189 [189]
9/16 - 10/13	0	0	0	702 (114)	0	0	114 [114]	588 [562]	702 [676]
10/14 - 11/10	0	0	0	0	1,131 (935)	0	935 [935]	196 [196]	1,131 [1,131]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	534 [394]	57 [57]	258 [204]	167 [126]	2,454 [1,291]	0	3,471 [1,372]		
Released	259 [259]	232 [182]	851 [513]	957 [620]	4,975 [2,792]	0		7,274 [2,923]	
Total	793 [633]	289 [237]	1,110 [643]	1,124 [722]	7,428 [3,302]	0			10,745 [3,506]

Table 35. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for rock bass, yellow perch and other sunfish from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	4 (4)	0	0	52 (0)	112 (48)	0	52 [48]	116 [82]	168 [123]
4/29 - 5/26	0	0	0	0	648 (0)	0	0	648 [506]	648 [506]
5/27 - 6/23	11 (0)	62 (0)	0	0	164 (60)	0	60 [60]	178 [122]	237 [136]
6/24 - 7/21	79 (0)	40 (0)	587 (0)	59 (12)	0	0	12 [12]	753 [595]	765 [596]
7/22 - 8/18	1007 (0)	0	348 (0)	0	0	0	0	1,356 [1,056]	1356 [1056]
8/19 - 9/15	189 (189)	0	0	0	0	0	189 [189]	0	189 [189]
9/16 - 10/13	96 (0)	0	8 (8)	0	0	0	8 [8]	96 [60]	104 [60]
10/14 - 11/10	133 (114)	0	0	0	0	36 (36)	150 [103]	19 [13]	169 [113]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	307 [212]	0	8 [8]	12 [12]	108 [77]	36 [36]	470 [229]		
Released	1,212 [1,012]	102 [74]	935 [667]	99 [70]	817 [520]	0		3,165 [1,323]	
Total	1,520 [1,035]	102 [74]	943 [667]	111 [79]	924 [532]	36 [36]			3,636 [1,346]

Table 36. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for smallmouth bass from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	1,429 (808)	182 (111)	6 (0)	86 (43)	415 (229)	138 (0)	1,190 [620]	1,065 [427]	2,256 [974]
4/29 - 5/26	239 (15)	3,709 (70)	179 (0)	44 (0)	8,019 (3,567)	1,123 (302)	3,955 [2,245]	9,359 [4,252]	13,314 [5,429]
5/27 - 6/23	204 (58)	1,065 (265)	524 (0)	722 (331)	5,259 (0)	4 (0)	654 [262]	7,124 [4887]	7,778 [4,918]
6/24 - 7/21	28 (0)	863 (25)	27 (0)	799 (172)	244 (103)	139 (18)	317 [202]	1,784 [939]	2,101 [1,086]
7/22 - 8/18	1,227 (338)	1275 (57)	48 (0)	111 (111)	1,090 (617)	384 (101)	1,225 [662]	2,910 [1,288]	4,136 [1,737]
8/19 - 9/15	111 (13)	637 (31)	43 (22)	0	1,089 (118)	246 (0)	184 [118]	1,943 [1,045]	2,126 [1,053]
9/16 - 10/13	288 (163)	436 (49)	88 (0)	584 (0)	0	0	211 [115]	1,186 [341]	1,397 [347]
10/14 - 11/10	861 (311)	0	82 (0)	0	565 (416)	0	727 [460]	781 [394]	1,509 [711]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	51 (51)	0	0	0	0	0	51 [51]	0	51 [51]
Harvested	1,758 [651]	607 [199]	22 [22]	657 [302]	5,050 [2,365]	421 [258]	8,515 [2,493]		
Released	2,682 [973]	7,560 [3,335]	977 [355]	1,690 [758]	11,630 [5,727]	1,613 [689]		26,151 [6,786]	
Total	4,440 [1,472]	8,167 [3,376]	998 [357]	2,347 [1,013]	16,680 [6,708]	2,034 [915]			34,666 [7,781]



Table 37. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for largemouth bass from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	0	885 (189)	9 (9)	14 (0)	52 (0)	0	198 [151]	762 [672]	960 [817]
4/29 - 5/26	53 (10)	66 (0)	1,282 (0)	0	1,630 (234)	24 (0)	244 [192]	2,811 [1,217]	3,055 [1,196]
5/27 - 6/23	56 (0)	47 (0)	739 (98)	0	0	0	98 [98]	744 [353]	842 [401]
6/24 - 7/21	0	139 (0)	0	0	0	0	0	139 [116]	139 [116]
7/22 - 8/18	32 (0)	206 (0)	0	167 (167)	173 (35)	13 (0)	202 [171]	390 [250]	592 [318]
8/19 - 9/15	0	62 (0)	0	0	0	41 (0)	0	103 [74]	103 [74]
9/16 - 10/13	0	216 (0)	0	62 (0)	0	0	0	278 [191]	278 [191]
10/14 - 11/10	0	0	81 (0)	0	0	0	0	81 [81]	81 [81]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	10 [10]	189 [151]	107 [99]	167 [167]	268 [195]	0	742 [314]		
Released	131 [78]	1,430 [740]	2,004 [929]	77 [47]	1,587 [873]	79 [50]		5308 [1,477]	
Total	141 [76]	1,620 [874]	2,111 [948]	244 [174]	1,855 [850]	79 [50]			6,049 [1,557]

Table 38. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for white and black crappie from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	72 (12)	1,324 (749)	200 (200)	408 (303)	96 (32)	0	1,296 [682]	804 [474]	2,100 [1,140]
4/29 - 5/26	89 (50)	83 (83)	78 (78)	0	340 (284)	463 (326)	821 [398]	233 [147]	1,054 [518]
5/27 - 6/23	0	23 (23)	366 (255)	118 (89)	0	0	367 [243]	141 [115]	508 [356]
6/24 - 7/21	27 (0)	243 (151)	1,507 (430)	1,211 (1,211)	116 (116)	62 (62)	1,969 [1,300]	1,195 [1,080]	3,164 [1,945]
7/22 - 8/18	0	0	224 (188)	0	2,974 (1,274)	0	1,461 [854]	1,737 [1,149]	3,198 [1,995]
8/19 - 9/15	9 (9)	0	1,010 (616)	201 (201)	92 (71)	0	898 [474]	415 [295]	1,313 [726]
9/16 - 10/13	38 (0)	0	64 (64)	19 (0)	0	19 (0)	64 [64]	76 [47]	140 [79]
10/14 - 11/10	6 (6)	0	84 (10)	41 (33)	0	0	49 [35]	82 [46]	131 [62]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	78 [53]	1,006 [624]	1,841 [679]	1,838 [1,268]	1,776 [873]	387 [331]	6,926 [1,826]		
Released	163 [85]	668 [464]	1,692 [1,122]	162 [111]	1,842 [1,152]	157 [132]		4,684 [1,685]	
Total	241 [118]	1,674 [1,072]	3,533 [1,708]	1,999 [1,300]	3,618 [2,003]	544 [461]			11,610 [3,161]

Table 39. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for sauger from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	150 (0)	291 (211)	45 (45)	32 (20)	1,069 (492)	152 (37)	805 [307]	935 [248]	1,741 [460]
4/29 - 5/26	23 (0)	0	0	0	354 (133)	155 (0)	133 [78]	399 [184]	532 [241]
5/27 - 6/23	0	0	118 (0)	868 (769)	636 (0)	263 (204)	972 [752]	912 [477]	1,885 [895]
6/24 - 7/21	72 (0)	411 (172)	0	0	449 (167)	950 (0)	339 [172]	1,543 [980]	1,882 [1,007]
7/22 - 8/18	0	405 (27)	0	0	0	63 (0)	27 [16]	441 [223]	467 [233]
8/19 - 9/15	0	54 (0)	76 (60)	0	0	0	60 [60]	70 [57]	130 [93]
9/16 - 10/13	25 (11)	0	32 (16)	545 (55)	0	169 (125)	207 [122]	564 [261]	771 [315]
10/14 - 11/10	17 (0)	0	0	1,056 (32)	0	3 (3)	35 [32]	1041 [980]	1,076 [982]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	73 (73)	0	0	0	0	0	73 [51]	0	73 [51]
Harvested	84 [52]	410 [176]	121 [77]	875 [739]	791 [309]	369 [191]	2,650 [847]		
Released	277 [121]	751 [280]	150 [120]	1,625 [1,018]	1,717 [536]	1,386 [966]		5,905 [1,538]	
Total	360 [133]	1,161 [353]	271 [151]	2,501 [1,264]	2,508 [680]	1,754 [994]			8,555 [1,793]

Table 40. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for walleye from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	6,631 (1,267)	1,243 (447)	227 (141)	230 (106)	7,479 (1,548)	310 (15)	3,525 [728]	12,595 [2,773]	16,120 [3,330]
4/29 - 5/26	4,625 (1,344)	3,939 (1,104)	632 (302)	1,172 (873)	4,053 (1,178)	1,474 (735)	5,536 [1,459]	10,958 [2,813]	16,494 [4,055]
5/27 - 6/23	2,723 (366)	4,259 (1,761)	1,501 (742)	20,942 (5,050)	1,511 (527)	152 (113)	8,558 [2,732]	22,530 [10,098]	31,089 [12,523]
6/24 - 7/21	3,425 (956)	768 (266)	994 (352)	1,899 (365)	706 (0)	1,191 (523)	2,463 [727]	6,520 [1,998]	8,983 [2,452]
7/22 - 8/18	3,995 (1,483)	595 (111)	914 (157)	4,301 (2,608)	2,924 (1,226)	821 (65)	5,650 [2,825]	7,898 [2,313]	13,549 [4,824]
8/19 - 9/15	1,009 (733)	217 (124)	595 (244)	240 (48)	142 (85)	0	1,233 [410]	970 [410]	2,203 [766]
9/16 - 10/13	738 (159)	126 (44)	314 (48)	2,868 (712)	106 (53)	924 (386)	1,402 [502]	3,674 [1,242]	5,076 [1,644]
10/14 - 11/10	339 (73)	0	547 (191)	1,798 (317)	2,196 (88)	390 (135)	804 [327]	4,465 [1,832]	5,269 [1,930]
11/11 - 12-8	96 (51)	0	0	0	176 (114)	0	165 [120]	106 [73]	272 [189]
12/9 - 12/31	489 (304)	0	0	52 (35)	0	0	339 [186]	203 [133]	541 [305]
Harvested	6,737 [1,216]	3,859 [962]	2,176 [631]	10,111 [3,674]	4,820 [1,593]	1,973 [610]	29,676 [4,383]		
Released	17,331 [3,196]	7,288 [2,451]	3,548 [965]	23,991 [10,235]	14,474 [3,041]	3,288 [922]		69,920 [11,490]	

Total	24,068 [4,176]	11,147 [3,281]	5,724 [1,445]	34,102 [13,130]	19,294 [4,032]	5,261 [1,355]			99,595 [14,859]
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Table 41. Total catch (harvested fish) by survey period and zone and number of fish harvested, released and total catch [standard error] by survey period and by zone for freshwater drum from the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Survey Period	Zone						Harvested	Released	Total
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River			
4/1 - 4/28	0	262 (170)	36 (0)	0	461 (96)	6 (0)	266 [178]	498 [232]	764 [341]
4/29 - 5/26	0	7 (0)	64 (32)	242 (21)	7408 (3,624)	267 (49)	3,727 [1,256]	4,262 [2,290]	7,988 [2,494]
5/27 - 6/23	19 (0)	901 (105)	0	5,093 (1,761)	4,183 (2,304)	800 (187)	4,357 [2,559]	6,640 [2,660]	10,996 [3,558]
6/24 - 7/21	28 (28)	2,305 (2,152)	134 (69)	678 (330)	12,591 (7,392)	554 (108)	10,079 [3,560]	6,210 [1,999]	16,290 [5,135]
7/22 - 8/18	0	12 (12)	701 (0)	26 (26)	5,457 (1,371)	38 (0)	1,408 [1,242]	4,825 [2,436]	6,233 [3,235]
8/19 - 9/15	0	0	32 (32)	228 (0)	0	164 (0)	32 [19]	392 [281]	425 [282]
9/16 - 10/13	0	0	0	1,474 (440)	0	44 (44)	484 [219]	1,034 [483]	1,518 [552]
10/14 - 11/10	0	0	0	16 (8)	278 (278)	0	286 [278]	8 [8]	294 [278]
11/11 - 12-8	0	0	0	0	0	0	0	0	0
12/9 - 12/31	0	0	0	0	0	0	0	0	0
Harvested	28 [28]	2,439 [1,921]	134 [78]	2,585 [1,577]	15,064 [4,036]	388 [152]	20,638 [4,743]		
Released	19 [19]	1,047 [805]	834 [641]	5,172 [2,366]	15,313 [3,954]	1,484 [568]		23,868 [4,756]	
Total	47 [34]	3,486 [2,095]	968 [647]	7,757 [2,829]	30,377 [6,565]	1,872 [616]			44,507 [7,503]

Table 42. Estimated harvest of selected fishes by year, April through September, from the Missouri River between Fort Randall and Gavins Point Dams.

Year	Channel catfish	Northern pike	White bass	Smallmouth bass	Largemouth bass	Sauger	Walleye	Total
1984 <sup>1</sup>	8,498	1,008	2,792	198	328	2,656	12,167	32,908
1994 <sup>2</sup>	10,073	163	1,244	1,400	18	3,542	16,915	47,994
1995 <sup>*3</sup>	5,525	0	2,318	2,540	112	7,156	22,772	39,302
2000	18,782 <sup>**</sup>	1,044	575	2,584	473	1,356	21,470	63,608

<sup>1</sup> Stone 1985 <sup>2</sup> Wickstrom 1995 <sup>3</sup> Wickstrom 1996

\* represents May through September values

\*\* includes flathead catfish and bullheads

Table 43. Estimated harvest rates (fish/hour) of selected fishes by year, April through September, for the Missouri River Between Fort Randall and Gavins Point Dams.

Year	Channel catfish	Northern pike	White bass	Smallmouth bass	Largemouth Bass	Sauger	Walleye	Total
1984 <sup>1</sup>	0.08	0.01	0.03	<0.01	<0.01	0.03	0.12	0.32
1994 <sup>2</sup>	0.08	<0.01	0.01	0.02	<0.01	0.03	0.14	0.39
1995 <sup>*3</sup>	0.03	0	0.01	0.01	<0.01	0.04	0.12	0.21
2000	0.08 <sup>**</sup>	0.01	<0.01	0.01	<0.01	0.01	0.10	0.28

<sup>1</sup> Stone 1985 <sup>2</sup> Wickstrom 1995 <sup>3</sup> Wickstrom 1996

\* represents May through September values

\*\* includes flathead catfish and bullheads

Table 44. Estimated harvest of selected fishes by year, April through September, from Gavins Point Dam tailwater.

Year	Channel catfish	Northern pike	White bass	Smallmouth bass	Largemouth bass	Sauger	Walleye	Total
1984 <sup>1</sup>	2,138	148	4,419	475	34	4,143	6,554	45,101
1994 <sup>2</sup>	8,917	1,722	7,175	2,211	0	5,264	6,550	81,450
1995 <sup>*3</sup>	3,885	2,357	1,798	309	0	1,180	7,182	36,328
2000	10,021 <sup>**</sup>	137	7,388	4,634	268	791	4,593	53,301

<sup>1</sup> Stone 1985 <sup>2</sup> Wickstrom 1995 <sup>3</sup> Wickstrom 1996

\* represents May through September values

\*\* includes flathead catfish, blue catfish, and bullheads

Table 45. Estimated harvest rates (fish/hour) of selected fishes by year, April through September, from Gavins Point Dam tailwater

Year	Channel catfish	Northern pike	White bass	Smallmouth bass	Largemouth bass	Sauger	Walleye	Total
1984 <sup>1</sup>	0.03	<0.01	0.06	0.01	<0.01	0.05	0.08	0.57
1994 <sup>2</sup>	0.10	0.02	0.08	0.02	0	0.06	0.07	0.89
1995 <sup>*3</sup>	0.04	0.03	0.02	<0.01	0	0.01	0.08	0.39
2000	0.08 <sup>**</sup>	<0.01	0.06	0.04	<0.01	0.01	0.04	0.40

<sup>1</sup> Stone 1985 <sup>2</sup> Wickstrom 1995 <sup>3</sup> Wickstrom 1996

\* represents May through September values

\*\* includes flathead catfish, blue catfish, and bullheads



### Angler Satisfaction

During interviews anglers were asked several questions about their fishing trip and current fishing regulations. The first question asked “Considering all factors, how satisfied are you with your fishing trip today?”. The second question asked “How would you rate your fishing today in terms of catching the number of fish you were expecting?”. The responses to these questions are presented by zone in Table 46 and by period in Table 47. Over 60% of respondents indicated that they were at least slightly satisfied with their fishing trips. Whereas 56% would rate their fishing trip at least “fair” in terms of catching the number of fish they were expecting. The Upper River and Lewis and Clark had the highest rate of dissatisfied anglers while the Islands followed by the Upper River and Gavins Point had the most anglers rate their fishing trip as good or excellent. Angler satisfaction was highest during the 27 May to 23 June period while more anglers rated their fishing trips either good or excellent during the 22 July to August 18 period than any other period.

In order to look at the effect of catching fish on angler satisfaction, we grouped parties by the number of fish they caught (Figure 4). The results of the two questions were then grouped by number of fish caught (Table 48). Parties that did not catch any fish were dissatisfied with their trip 45% of the time. Parties that caught at least one and up to four fish indicated that they were dissatisfied 32% of the time and parties that caught at least 5 or more fish indicated they were dissatisfied with their fishing trip 19% of the time. All parties that caught 60 or more fish were either moderately or very satisfied with their trips. Parties that caught 20 or more fish rated their fishing trips “fair” or better over 80% of the time. Whereas parties that caught less than 5 fish rated their fishing trip as “poor” or “very poor” over 50% of the time

Anglers were also asked “Are you in favor of the current 15-inch minimum length regulation for walleye/sauger?”. Over 90% of all anglers and 89% of anglers seeking walleye or sauger responded that they were in favor of the current 15-inch minimum length regulation (Table 49).

Table 46. Angler satisfaction and fishing trip rating by zone for anglers fishing the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Satisfaction %	Zone						Total %
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River	
Very	13.8	7.5	17.5	16.3	11.0	12.5	11.5
Moderate	17.2	31.8	17.5	16.3	29.6	16.7	26.3
Slight	19.0	23.4	32.5	18.4	21.2	29.2	22.2
Neutral	38.0	4.7	20.0	16.3	12.9	25.0	15.1
Slight Dissatisfaction	6.9	11.2	10.0	22.5	10.3	4.2	10.9
Moderate Dissatisfaction	3.5	12.2	0.0	6.1	7.1	12.5	7.3
Very Dissatisfied	1.7	9.4	2.5	4.1	8.0	0.0	6.6
Number	58	107	40	49	311	24	589
Rating %	Zone						Total %
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River	
Excellent	5.2	3.9	7.3	2.0	2.3	4.6	3.3
Good	15.5	19.2	24.4	12.2	21.0	4.6	19.0
Fair	34.5	34.6	26.8	36.7	34.0	47.8	34.4
Poor	44.8	21.2	34.2	36.7	30.0	43.5	31.3
Very Poor	0.0	21.2	7.3	12.2	12.7	0	12.0

Number	58	104	41	49	300	23	575
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Table 47. Angler satisfaction and fishing trip rating by survey period for anglers fishing the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Satisfaction %	Creel Period								Total %
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	
Very	15.7	25.4	10.2	7.6	12.5	12.0	2.2	0.0	11.4
Moderate	40.0	13.4	28.6	8.9	33.7	20.0	34.8	25.0	26.2
Slight	21.4	22.4	16.3	31.7	25.9	14.7	20.7	50.0	22.4
Neutral	7.1	7.5	9.2	22.8	10.6	20.0	27.2	25.0	15.1
Slight Dissatisfaction	5.7	11.9	8.2	20.3	8.7	12.0	10.9	0.0	10.9
Moderate Dissatisfaction	4.3	7.5	13.3	6.3	4.8	13.3	2.2	0.0	7.3
Very Dissatisfied	5.7	12.0	14.3	2.5	2.9	8.0	2.2	0.0	6.6
Number	70	67	98	79	104	75	92	4	589
Rating %	Creel Period								Total %
	4/1-4/28	4/29-5/26	5/27-6/23	6/24-7/21	7/22-8/18	8/19-9/15	9/16-10/13	10/14-11/10	
Excellent	7.5	3.2	2.0	3.7	2.1	6.7	0.0	0.0	3.3
Good	12.0	20.6	15.2	20.0	30.5	10.7	19.6	50.0	19.0
Fair	35.8	23.8	37.4	40.0	37.9	33.3	30.4	25.0	34.4

Poor	28.4	38.1	25.3	26.3	23.2	36.0	44.6	25.0	31.3
Very Poor	16.4	14.3	20.2	10.0	6.3	13.3	5.4	0.0	12.0
Number	67	63	99	80	95	75	92	4	575

Figure 4. Frequency distribution of the number of fish caught per party from anglers fishing the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

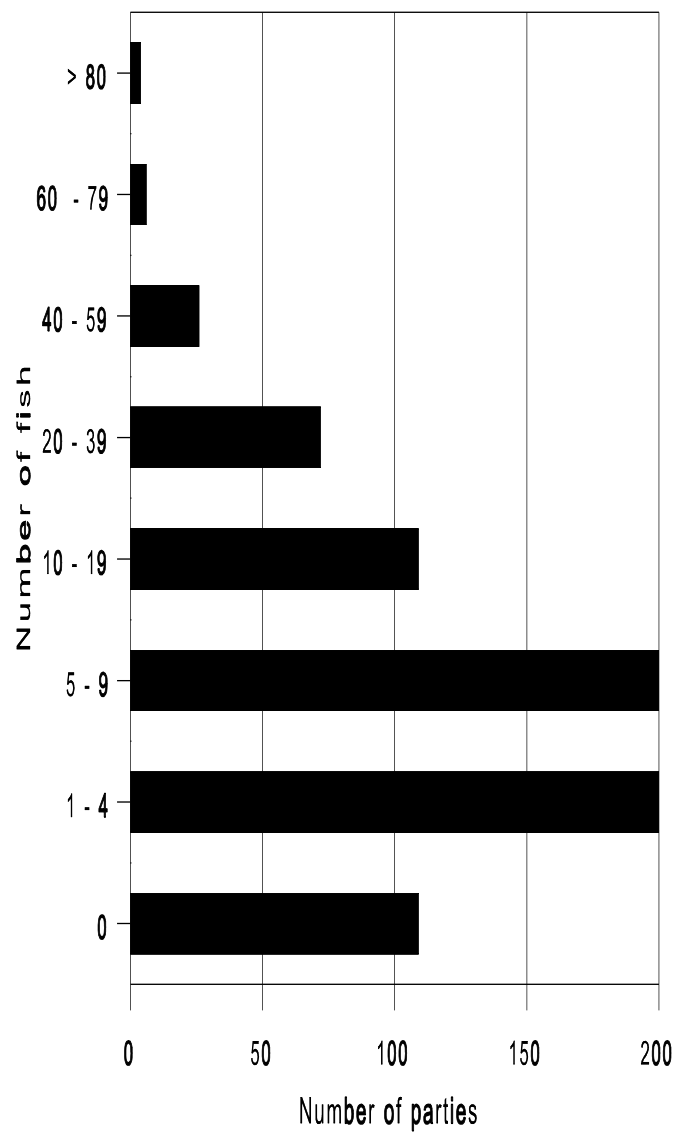


Table 48. Angler satisfaction and fishing trip rating by the number of fish caught for anglers fishing the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Satisfaction %	Number of Fish								Total %
	0	1 - 4	5 - 9	10 - 19	20 - 39	40 - 59	60 - 79	> 80	
Very	3.1	9.1	12.5	11.4	18.9	26.9	33.3	66.7	11.6
Moderate	9.3	14.0	30.2	39.1	52.2	34.6	66.7	33.3	26.4
Slight	21.7	25.8	24.0	21.0	16.0	23.1	0.0	0.0	22.3
Neutral	20.6	18.8	14.6	12.4	7.3	7.7	0.0	0.0	15.1
Slight Dissatisfaction	18.6	12.9	9.4	8.6	4.4	0.0	0.0	0.0	10.7
Moderate Dissatisfaction	13.4	11.3	3.1	4.8	1.5	0.0	0.0	0.0	7.3
Very Dissatisfied	13.4	8.1	6.3	2.9	0.0	7.7	0.0	0.0	6.6
Number	97	186	96	105	69	26	6	3	588
Rating %	Number of fish								Total %
	0	1 - 4	5 - 9	10 - 19	20 - 39	40 - 59	60 - 79	> 80	
Excellent	3.7	2.1	1.1	4.7	7.4	3.9	0.0	0.0	3.3
Good	2.4	12.2	25.5	25.5	29.4	38.5	16.7	66.7	19.0
Fair	22.0	32.3	36.2	37.7	42.7	38.5	83.3	33.3	34.5
Poor	42.7	40.2	27.7	24.5	17.7	15.4	0.0	0.0	31.2
Very Poor	29.3	13.2	9.6	7.6	3.0	3.9	0.0	0.0	12.0

Number	82	189	94	106	68	26	0	0	574
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Table 49. Percent of anglers and angler fishing for walleye or sauger by zone responding to question "Are you in favor of the current 15-inch minimum length regulation for walleye/sauger?" that were fishing the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

In Favor? %	Zone						Total %
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River	
All anglers							
Yes	88.0	91.0	100.0	87.5	90.7	85.7	90.6
No	12.0	9.1	0.0	12.5	9.3	14.3	9.4
Number	25	44	16	24	118	7	234
Anglers seeking walleye or sauger							
Yes	85.7	85.7	100	85.7	95.2	0.0	89.7
No	14.3	14.3	0.0	14.3	4.8	0.0	10.3
Number	14	14	2	7	21	0	58



### Recreational User Demographics

The number of vehicle license plates by state of origin by the recreational zone that they were contacted in are presented in Table 50. Contacts were made with vehicles from twenty nine states during 2000. Over 87% were from Nebraska (47.3%) and South Dakota (40.43%). Other more common states encountered were Iowa (10.03%), Minnesota (0.51%) and Missouri (0.31%).

Multiple contacts of the same vehicle were common during the survey. There were 816 multiple contacts or over 14% of the total number of contacts (Figure 5). Although 65% of these multiple contacts only involved two contacts with a vehicle, 282 different vehicles were contacted from three up to 13 times.

The post card survey asked recreational users the number of times that they planned on using the access site where they were contacted during 2000. Less than 4% of the recreational users indicated that they were planning on using the access site where they were contacted only once during the year (Table 51). Over 67% indicated that they would use the access where they were contacted eight or more times during the year. The post card survey also asked recreational users if the access site that they were contacted at met their needs and if not, to please comment. Overall response was positive, with nearly 79% of recreational users feeling that the access areas met their needs. Written responses by access site are presented in Appendix III. These comments are summarized in Table 52. The most common complaints concerned boat ramps followed by restrooms and showers, fish cleaning stations, trash and fishing.

Recreational users were asked on the post card survey if their trip required an overnight stay and if so where did they stay (state park camp ground, state park cabin, federal camp ground, with a friend or relative, motel, private cabin, private camp ground or other location). Table 53 breaks down the responses to this question by recreational group (fishing, hunting, boating and other) and zone. Nearly 40% of anglers, 62% of hunters, 53% of boaters and 60% of the remaining recreational users were involved with trips requiring overnight stays. Most recreational users stayed at state park camp grounds, followed by motels, state park cabins, private campgrounds and private cabins (Table 54).

During interviews information was collected on the age and gender of each recreational user. Table 55

presents this information broken down by age group, gender and zone. Nearly 82% of the recreational users contacted during the interviews were male. Less than 14% of the users were younger than 20 years of age.

During 2000 resident anglers (Nebraska and South Dakota) comprised 84% of the total anglers between Fort Randall and Gavins Point Dams and 94% of the total anglers at Gavins Point Dam tailwater, based on combined report card and interview data (Table 56). Resident angling activity for the Fort Randall Dam to Gavins Point Dam reach was slightly lower than previous years but still represented a high proportion of total use. Whereas, resident angling activity at Gavins Point Dam tailwater was slightly higher than previous surveys and an extremely high proportion of total use.

Only 24% of the anglers interviewed during 2000 on the Missouri River between the Fort Randall tailwater and the Gavins Point Dam traveled less than 100 miles one-way to fish (Table 57). This percentage was considerably less than in previous surveys. Only 3% of the anglers traveled more than 200 miles one-way to fish the Missouri River, which was also less than in previous surveys. The Gavins Point tailwater also had a lower percentage of anglers that traveled less than 100 miles one-way and a slightly lower percentage of anglers that traveled more than 200 miles one-way. It appears that there were more anglers willing to travel between 100 miles and 200 miles one-way to fish the Missouri River during 2000 than in previous years. More angler travel was responsible for the increase in total fishing pressure for both the Missouri River between Fort Randall and Gavins Point Dams and Gavins Point Dam tailwater during 2000 compared to previous years.

Table 50. Continued.

Table 50. Number of license plates by state of origin and by zone identified during recreational survey on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

State	Zone						Total	Percent
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River		
Alaska				1			1	0.02
Arkansas			1	1	2		4	0.07
Arizona		1		1	1		3	0.05
California	1						1	0.02
Colorado		2	1	2	3	2	10	0.17
Florida				3			3	0.05
Iowa	129	29	70	182	110	55	575	10.03
Idaho				1			1	0.02
Illinois	1	3	3		3		10	0.17
Indiana		2				1	3	0.05
Kansas	1			1	2	1	5	0.09
Louisiana					1		1	0.02
Massachusetts					1		1	0.02
Michigan			3				3	0.05
Minnesota	4	4	1	9	7	4	29	0.51
Missouri	3	1	6		6	2	18	0.31

Table 50. Continued.

State	Zone						Total	Percent
	Fort Randall	Upper River	Islands	Lewis and Clark	Gavins Point	Lower River		
Mississippi				2			2	0.03
Montana	1						1	0.02
North Dakota				1	1	1	3	0.05
Nebraska	161	660	72	533	952	333	2711	47.30
Ohio		1	1	1			3	0.05
Oklahoma					1		1	0.02
Oregon					2		2	0.03
Pennsylvania					1		1	0.02
South Dakota	265	107	366	585	505	489	2317	40.43
Texas	2		1	1	3		7	0.12
Washington	1						1	0.02
Wisconsin	1		2	2	1	3	9	0.16
Wyoming					1	1	2	0.03
Government		2				1	3	0.05
Total	570	812	527	1326	1603	893	5731	

Figure 5. Frequency distribution of multiple encounters with individual license plates during recreational survey on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

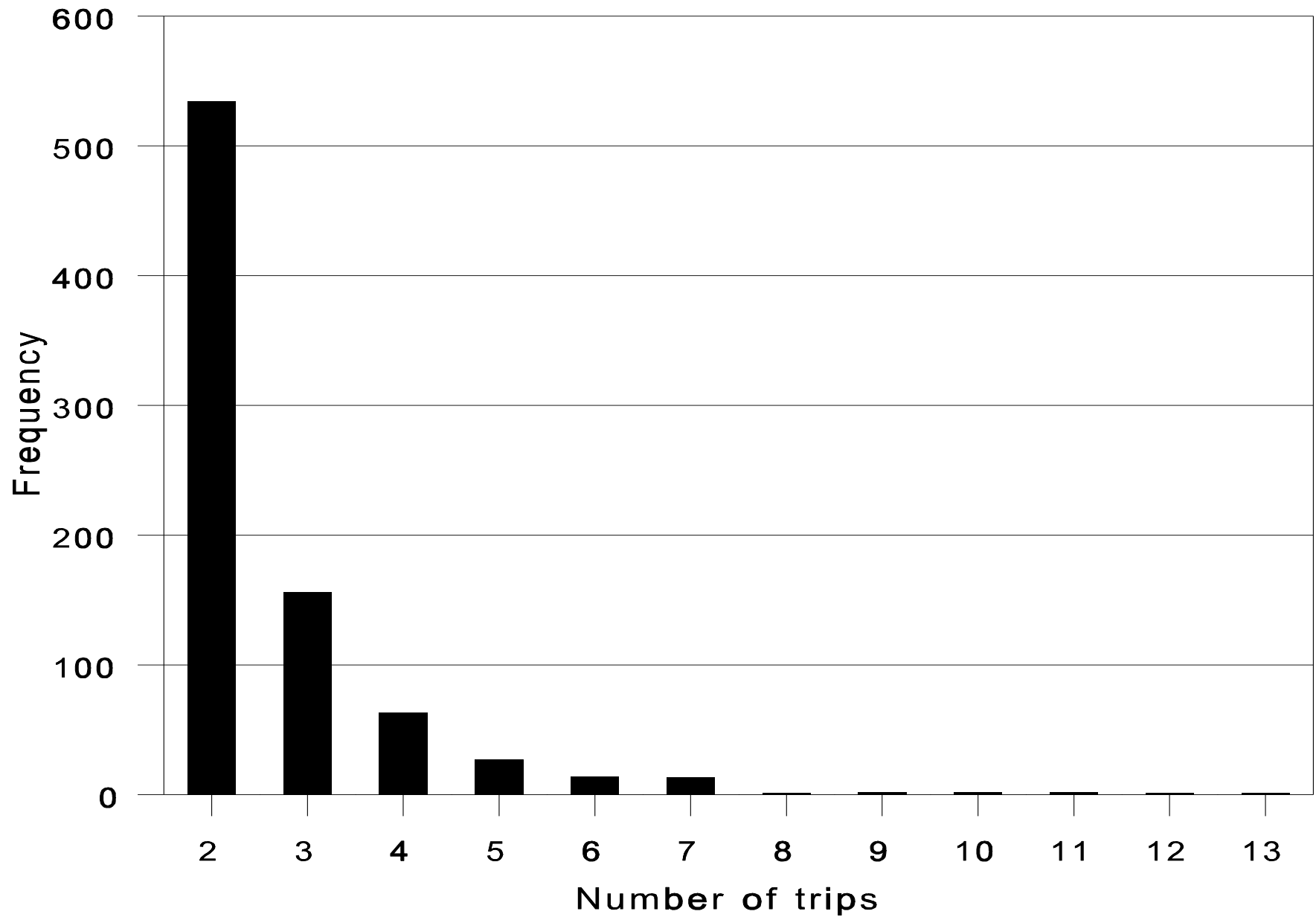


Table 51. Number of responses and percent of respondents indicating the number of times they planned on using an individual access and if that access met their needs from recreational users on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

[illegible]

Table 51. Continued.

Zone	State	Site	Number of cards	Time used				Number of cards	Meet needs	
				once	2 -4	5 -7	8 or more		Yes	No
Clark		Bloomfield	7	0	0	0	100	6	50.0	50.0
		Weigand	84	3.57	15.48	15.48	65.48	82	76.83	23.17
		South Shore	1	0	0	0	100	1	0	100
	SD	Charley Creek	17	0	0	11.76	88.24	17	70.59	29.41
		Tabor	13	7.69	30.77	7.69	53.85	11	81.82	18.18
		Gavins Point Unit	44	0	13.64	25.0	61.36	43	88.37	11.63
		Midway	64	0	7.81	15.63	76.56	63	92.06	7.94
		Yankton Marina	70	2.86	20.0	17.14	60.00	72	88.89	11.11
Gavins Point	NE	South Bank	202	4.46	17.82	18.32	59.41	200	78.5	21.5
	NE SD	North Bank	150	4.0	22.0	8.67	65.33	149	83.89	16.11
Lower River	NE	St Helena	34	2.94	14.71	26.47	55.88	33	72.73	27.27
		Brooky Bottom	35	2.86	8.57	2.86	85.71	37	89.19	10.81
		Mulberry Bend	6	0	0	0	100	6	50.0	50.0
		Ponca State Park	28	0	10.71	14.29	75.0	26	92.31	7.69
	SD	Riverside Park	73	2.74	2.74	4.11	90.41	75	72.0	26.67
		Bolton	10	0	10.0	10.0	80.0	10	70.0	30.0
		Myron Grove	8	12.5	0	12.5	75.0	8	100	0
		Clay County	51	0	5.88	7.84	86.27	48	72.92	27.08
		Rosenbaum	30	0	3.33	16.67	80.0	30	83.33	16.67

Table 51. Continued.

Zone	State	Site	Number of cards	Time used				Number of cards	Meet needs	
				once	2 -4	5 -7	8 or more		Yes	No
Total			1527	3.54	13.95	14.67	67.85	1487	78.95	20.91

Table 52. Comments from post cards from recreational who felt that the access did not meet their needs from recreational survey on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Access Site	Fishing	Camping	Restroom & showers	Cleaning Station	Trash	Ramp/ Dock	Parking	Access Road	Lights	Flows	Jet Ski
Fort Randall	Fort Randall Tailwaters	2	2	1	2	0	0	0	0	0	0	0
	Randall Creek	4	2	3	4	4	0	0	0	0	0	0
Upper River	Boyd County	0	0	0	0	0	1	0	0	0	0	0
	Verdel	2	3	9	15	9	11	0	3	0	1	1
	Niobrara Townsite	2	0	0	0	0	2	0	0	0	0	0
	Ferry Landing	2	0	1	0	2	2	0	0	0	0	0
	Bazile Creek	0	0	0	1	1	0	0	1	1	0	0
	Running Water	3	0	1	1	0	3	1	0	0	0	0
	Bottom Road	2	0	2	0	1	1	0	0	0	0	0
	Springfield	2	1	3	3	0	4	0	0	0	1	0
	Sand Creek	0	0	1	2	1	1	0	0	0	2	0
	Snatch Creek	1	0	0	0	0	0	0	0	0	0	0
	Navraitils	0	2	1	1	0	9	3	0	0	0	0
Lewis and Clark	Miller Creek	0	0	1	1	0	0	0	0	0	0	0
	Bloomfield	2	0	0	0	0	1	0	0	0	0	0
	Burbach	0	0	0	0	0	0	0	0	0	0	0



Table 52. Continued.

Zone	Access Site	Fishing	Camping	Restroom & showers	Cleaning Station	Trash	Ramp/ Dock	Parking	Access Road	Lights	Flows	Jet Ski
	Weigand	5	0	3	0	1	3	0	0	0	0	0
	South Shore	0	0	1	0	0	0	0	0	0	0	0
	Charley Creek	1	0	1	0	0	4	0	0	0	2	0
	Tabor	2	0	0	0	0	2	0	0	0	0	1
	Gavins Point Unit	3	0	0	3	1	1	0	0	0	1	0
	Midway	1	0	6	0	1	1	0	0	0	0	0
	Yankton Marina	1	0	2	3	0	1	0	0	0	0	0
Gavins Point	South Bank Tailwaters	10	0	8	0	7	4	0	1	0	0	1
	North Bank Tailwaters	6	0	6	2	3	6	0	0	0	0	0
Lower River	St. Helena	0	0	3	1	0	0	0	1	0	1	0
	Brooky Bottom	1	0	2	0	0	5	0	0	0	1	0
	Mulberry Bend	1	0	1	0	0	2	0	0	0	0	0
	Ponca SP	0	0	0	1	0	0	0	0	0	0	0
	Riverside Park	0	0	0	1	0	16	0	0	0	1	5
	Myron Grove	0	0	0	0	0	0	1	0	0	0	0
	Clay County	1	0	1	0	2	10	2	0	1	0	0
	Bolton	1	0	0	0	0	4	0	0	0	1	0
	Rosenbaum	0	0	1	0	4	0	0	1	1	3	0
Total		55	10	58	41	37	94	7	7	3	14	8

Table 53. Number of each recreational group and total number and (percent) that stayed overnight on their trip while recreating on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Group								Total (%)	
	Fishing		Hunting		Boating		Other			
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Fort Randall	116	32	0	0	0	0	0	0	116 (78.38)	32 (21.62)
Upper River	107	166	5	1	7	18	2	1	121 (39.41)	186 (60.59)
Islands	32	36	7	3	1	1	0	0	40 (50)	40 (50)
Lewis and Clark	80	72	0	1	53	21	3	0	136 (59.13)	94 (40.87)
Gavins Point	164	441	0	2	1	9	9	2	174 (27.71)	454 (82.29)
Lower River	45	72	1	1	9	15	1	7	56 (37.09)	95 (62.91)
Zone Total (%)	544 (39.91)	819 (60.09)	13 (61.9)	8 (28.1)	71 (52.59)	64 (47.41)	15 (60)	10 (40)	667 (41.98)	922 (58.02)

Table 54. Where (%) each recreational group and all users stayed that stayed overnight on their trip while recreating on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Location	Group				Total
	Fishing	Hunting	Boating	Other	
State Park camp ground	22.92	0	47.95	13.33	25.04
State Park cabin	14.98	0	4.11	13.33	13.44
Federal camp ground	10.47	15.38	2.74	13.33	9.77
Friend or relative	4.69	0	6.85	0	4.73
Motel	15.7	38.46	6.85	40.0	15.73
Private cabin	12.64	15.38	16.44	6.67	12.98
Private camp ground	10.11	15.38	10.96	0	10.08
Other	8.48	15.38	4.11	13.33	8.24
Number	554	13	73	15	655

Table 55. Age of females and males from interviews recreating on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Females							
	< 15	16 - 19	20 -29	30 -39	40 -49	50 - 59	> 59	Total
Fort Randall	2	0	2	2	1	6	8	21
Upper River	0	3	0	2	3	3	0	11
Islands	2	0	1	0	1	3	1	8
Lewis and Clark	2	1	3	3	3	0	0	12
Gavins Point	3	9	9	15	17	14	12	79
Lower River	1	0	0	1	1	0	0	3
Total number (%)	10 (7.46)	13 (9.7)	15 (11.19)	23 (17.16)	26 (19.4)	26 (19.4)	21 (15.67)	134
	Males							
	< 15	16 - 19	20 -29	30 -39	40 -49	50 - 59	> 59	Total
Fort Randall	6	4	5	8	9	15	16	63
Upper River	1	5	7	15	63	21	8	120
Islands	1	1	3	3	4	7	12	31
Lewis and Clark	9	0	4	10	7	8	5	43
Gavins Point	9	35	28	60	52	54	73	311
Lower River	4	0	9	5	7	7	5	37
Total number (%)	30 (5.0)	45 (7.43)	56 (9.26)	101 (16.69)	142 (23.47)	112 (18.51)	119 (19.67)	605
Total (%)	40 (5.41)	58 (7.85)	71 (9.61)	124 (16.78)	168 (22.73)	138 (18.67)	140 (18.94)	739

Table 56. Percentage of resident anglers (Nebraska and South Dakota) at the Missouri River between Fort Randall and Gavins Point Dams and at Gavins Point Dam tailwater.

Year	Missouri River	Gavins Point tailwater
1984 <sup>1</sup>	90	Included in Missouri River
1994 <sup>2</sup>	85	92
1995 <sup>3</sup>	88	92
2000*	84	94

<sup>1</sup> Stone 1985   <sup>2</sup> Wickstrom 1995   <sup>3</sup> Wickstrom 1996

Table 57. Percentage of anglers who traveled a specific distance one-way to fish the Missouri River between Fort Randall and Gavins Point Dams and Gavins Point Dam tailwater.

Year	Missouri River		Gavins Point Dam tailwater	
	<100 miles	>200 miles	< 100 miles	> 200 miles
1984 <sup>1</sup>	75*	10**	Included in Missouri River	
1994 <sup>2</sup>	72	7	82	2
1995 <sup>3</sup>	Not asked			
2000	24	3	47	1

<sup>1</sup> Stone 1985   <sup>2</sup> Wickstrom 1995   <sup>3</sup> Wickstrom 1996

\* < 75 miles

\*\* > 175 miles

### Analysis of Methodology

Recreational surveys on large rivers with multiple access points are difficult to design and expensive to conduct.

We experimented with a new survey design using postage paid post cards to enable us to measure the recreational use on a large (235 kilometer) reach of Missouri River. This reach of Missouri River had 35 identified public access areas. Using a traditional design, counts would have been obtained through aerial flights and user information collected from exit interviews at randomly selected access areas. With two persons available for the survey, limited to a 40 hour work week, this would have meant that on any day or during any week, because of driving time and other factors, only a few access areas could be visited or that each access area could only be visited for a short time. Brief visits decrease the chances of the clerk contacting recreational users finishing their day and would result in few user interviews. Because recreational activity can differ greatly by access area, it is difficult to accurately describe recreational use at areas where you don't actually survey. Each survey design has its strengths and weaknesses and we want to briefly discuss the strengths and weaknesses of this design.

The survey design selected allowed us to visit each access area on each count day which enabled us to get an accurate recreational user and vehicle count and issue postage paid post cards to each user and vehicle. However we were dependent on recreational users filling out and returning these post cards for the information we needed to measure recreational activity. In order to limit missing information or inaccurate information the questions asked on the survey card were limited to a few simple questions. The most important of these were number in party, hours of recreational use and recreational activity. Several other questions were asked including zip code, creel information, information about overnight stay and location and frequency of use and satisfaction with the access area. We attempted to present each question in a simple, straightforward manner.

Over 5,700 cards were issued with an overall return rate of 31% (Table 58). The percent of returned cards varied by zone and by time period. We observed that individuals that were issued a single card during the year and individuals that were issued eight or more cards only responded about 28% of the time (Table 59). Users that were issued 5 or 6 cards had the highest response rate (>70%) and users that were issued 2, 3, 4 or 7 cards during the year had a response rate somewhere in between.

The catch rate report by anglers using the post cards was compared to the catch rate from anglers that were interviewed using paired T tests when possible. The results of this analysis is presented in Table 60. There a significant (Prob > T = 0.05) difference in only two out of 28 tests between the catch rates between the two survey methods.

A concern with using the hierarchical approach to assign users to groups was that we would overestimate fishing effort and underestimate effort of the other groups especially boating. Table 61 presents the percent of users by group that also reported that they participated in other recreational activities during their trip. About 15% of the users that were fishing also indicated that they were boating. For arguments sake, if we assumed that all of these users spent 25% of their trip boating (which is probably high for boating during a fishing trip) this would amount to less than 4% of the overall fishing effort ( $0.25 \times 15.3$ ).

In Table 62 we compare count numbers of recreational users obtained using the two count methods, the ground survey and flights. Included in the table are the range and mean of counts by zone and day type (weekend or weekday) for both count methods. Also included is the mean of the difference between the two counts (mean of the daily differences between the two count methods). This value is negative if the ground counts tended to be greater than the flight counts and positive if the flight counts were greater. The counts of bank users from both methods were fairly similar. Exceptions were, that flights did a poor job of counting bank users on Lewis and Clark on the weekends and that ground counts underestimated bank users on both the Upper and Lower River (reflecting the number of private access areas with higher weekend use not covered by the ground counts). The counts of boats were consistently underestimated by the ground counts when compared to flights. This reflects the impact of private boat docks, marinas and on the Lower River, boats traveling up the river into the zone from the Sioux City area.

#### Recommended Changes

- a. Need to ask the recreational user to break down hours by recreational activity. This would allow more accurate calculations of hours expended by activity. During this survey, even though the cards did not specifically ask recreational users other than anglers to report their hours, almost all did. This did allow us to estimate hours for at least the four groups (fishing, hunting, boating and other).
- b. Do not survey past November 1. Because of the cost to do this type of survey, it is probably not justified to try to conduct this type of survey during periods of low recreational use.
- c. Because of the large number of potential contacts, it may be possible to use multiple sets of survey cards each with a different set of questions (alternating between 2 or more cards as they are handed out).
- d. In order to increase the return rate of cards perhaps a reward system such as used to increase the rate of tag returns from fisheries studies could be implemented. Prizes could be awarded on a monthly basis with this information reported in the handout given with the post card. This might help increase the low return rate of single contacts and those contacted more than seven times.
- e. The reach of river that we surveyed during 2000 (235 kilometers) was almost too long for one clerk to cover in a day, especially during a weekend when the number of cards issued could be large. But by surveying the entire reach in a single year you eliminate between year variation which can be quite high due to weather or the highly managed flows on this reach of Missouri River. A possible solution is to use four part time clerks instead of two full time clerks. More clerks would mean that the driving distance on a given day could be cut in half, cards could be issued to all users and vehicles (during 2000 there were several instances where there were simply too many vehicles to issue cards too while still completing the count run) and possibly that more count runs per time period could be completed.



Table 58. Percent of postage paid survey cards returned by survey period and zone by recreational users on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Survey Period										Mean %
	4/1-4/28	4/29-5/2 6	5/27-6/2 3	6/24-7/2 1	7/22-8/1 8	8/19-9/1 5	9/16-10/ 13	10/14-1 1/10	11/11-1 2-8	12/9-12/ 31	
Fort Randall	41	32	25	20	31	27	33	29	67	24	33
Upper River	39	39	25	27	22	19	39	23	24	**	28
Islands	60	28	34	19	42	31	24	29	20	50	34
Lewis and Clark	43	31	25	19	26	29	28	24	**	31	28
Gavins Point	31	25	15	19	20	18	27	27	46	**	25
Lower River	52	40	30	25	25	34	32	44	**	**	35
Number of cards	266	195	154	129	166	158	183	176	157	105	1,689
Mean	44	32	26	21	28	26	30	29	39	35	31

\*\* no cards issued

Table 59. Total number (percent) of postage paid survey cards returned by issued by the number of survey cards issued to an particular vehicle license plate and the number of cards summarized by the number of cards returned by recreational users on the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Number of card issued	Number of cards issued to an individual	Number of cards returned by an individual								
		0	1	2	3	4	5	6	7	8 - 12
3355	1	2399 (71.5)	956 (28.5)							
501	2	274 (54.7)	153 (30.5)	74 (14.8)						
136	3	61 (44.9)	46 (33.8)	17 (12.5)	12 (8.8)					
58	4	24 (41.4)	15 (25.9)	8 (13.8)	5 (8.6)	6 (10.3)				
27	5	8 (29.6)	6 (22.2)	4 (14.8)	4 (14.8)	4 (14.8)	1 (3.7)			
14	6	4 (28.6)	5 (35.7)	2 (14.3)	1 (7.1)	2 (14.3)	0	0		
9	7	4 (44.4)	3 (33.3)	2 (22.2)	0	0	0	0	0	
18	8 - 12	13 (72.2)	3 (16.7)	2 (11.1)	0	0	0	0	0	0
4118		43.0	28.3	14.8	6.6	7.9	0.9	0	0	0

Table 60. Comparison of catch rates between survey cards and interviews from anglers fishing the Missouri River between Fort Randall and the Big Sioux River from April through December, 2000 (\*\* significant).

Survey period	Zone	Cards		Surveys		Prob > T
		N	Mean	N	Mean	
1	Fort Randall	45	1.34	4	2.18	0.47
	Upper River	38	0.75	4	0.63	0.73
	Islands	22	0.50	3	1.47	0.33
	Gavins Point	70	1.29	21	1.50	0.42
2	Upper River	28	0.98	5	2.00	0.01**
	Islands	17	0.87	5	0.50	0.15
	Lewis and Clark	26	0.33	2	1.19	0.48
	Gavins Point	61	1.48	12	2.21	0.30
	Lower River	30	0.98	5	1.11	0.81
3	Fort Randall	14	0.84	2	2.36	0.61
	Upper River	22	1.12	14	0.75	0.14
	Lewis and Clark	29	1.05	4	2.15	0.61
	Gavins Point	26	1.12	31	1.50	0.40
4	Fort Randall	15	1.26	8	1.06	0.62
	Lewis and Clark	22	0.39	5	0.74	0.15
	Gavins Point	33	1.17	8	3.64	0.43
	Lower River	28	0.80	3	1.38	0.33
5	Fort Randall	23	1.34	10	3.18	0.20
	Upper River	9	0.94	7	1.21	0.57
	Gavins Point	24	2.51	29	1.91	0.43
6	Upper River	14	1.33	14	1.12	0.60
	Islands	10	1.21	4	2.22	0.23
	Lewis and Clark	7	.72	2	.94	0.83
	Gavins Point	6	1.40	16	2.10	0.34
7	Fort Randall	17	1.06	7	0.79	0.28
	Upper River	13	0.60	3	0.96	0.62
	Gavins Point	7	0.44	12	1.69	0.004**
8	Islands	8	0.71	2	0.55	0.71

Table 61. Percent of users by group that also participated in other recreational activities from post card survey during recreational survey of the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Group	Hunt	Boat	Camp	Picnic	Observe wildlife	Photography	Sightseeing	Other
Fish	2.0	15.3	13.3	5.1	13.0	3.2	7.5	0.8
Hunt		5.7	2.9	0	20.0	5.7	2.9	0
Boat			13.6	26.8	21.1	28.6	10.4	4.3

Table 62. Comparison of bank and boat counts from between ground surveys and flights during recreational survey of the Missouri River between Fort Randall Dam and the Big Sioux River from April through December, 2000.

Zone	Day type	N	Bank Count					Boat Counts				
			Ground Survey		Mean of Difference	Flight		Ground Survey		Mean of Difference	Flight	
			Range	Mean		Range	Mean	Range	Mean		Range	Mean
Fort Randall	Weekend	7	0-32	11.4	-1.1	0-45	10.3	1-22	11.7	2.6	0-37	14.3
	Weekday	8	0-8	4.3	-1.4	0-8	2.9	1-6	3.6	1.1	1-15	4.8
Upper River	Weekend	7	1-11	4.3	4.6	2-27	8.9	2-35	22.3	14.3	0-86	36.6
	Weekday	8	0-5	1.6	-0.6	0-4	1.0	0-13	5.4	1.9	2-21	7.3
Islands	Weekend	7	0-17	5.9	-1.4	0-17	4.4	1-24	10.6	0.3	3-18	10.9
	Weekday	8	0-7	3.4	-0.4	0-14	3.0	0-9	3.1	-0.3	0-8	2.9
Lewis and Clark	Weekend	7	0-37	10.9	-10.6	0-2	0.3	1-126	50.6	31.6	2-345	82.1
	Weekday	8	0-8	2.8	-1.1	0-6	1.6	1-33	12.5	5.9	3-72	18.4
Gavins Point	Weekend	Not counted during flights										
	Weekday											
Lower River	Weekend	7	1-7	3.7	20.0	5-51	23.7	4-59	23.6	58.9	8-318	82.4
	Weekday	8	0-5	1.4	3.3	0-13	4.6	0-10	4.8	6.4	1-25	11.1

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